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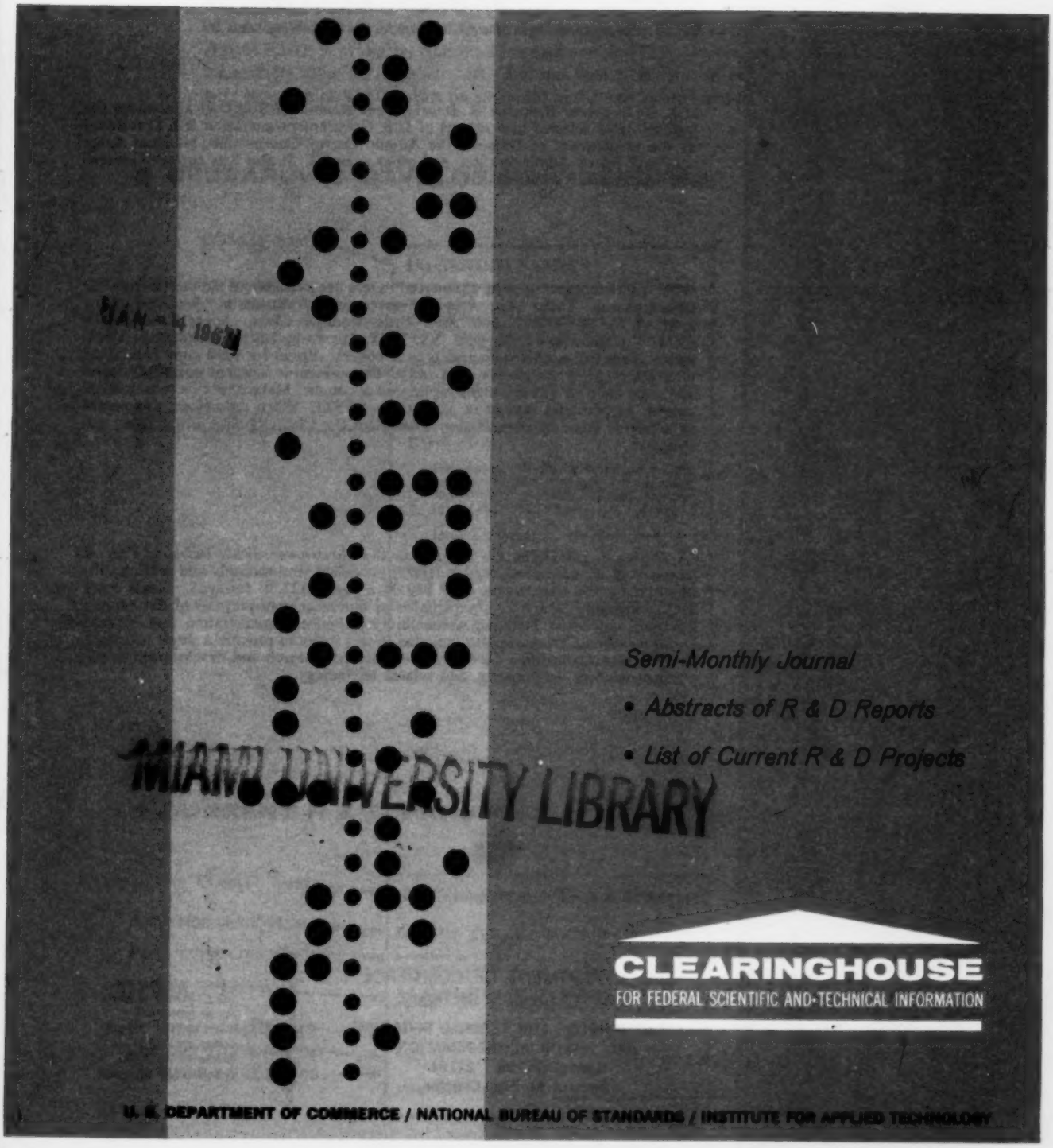
U.S. GOVERNMENT RESEARCH & DEVELOPMENT REPORTS

November 25, 1966



JAN - 4 1967

Semi-Monthly Journal

- *Abstracts of R & D Reports*
- *List of Current R & D Projects*

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U. S. DEPARTMENT OF COMMERCE / NATIONAL BUREAU OF STANDARDS / INSTITUTE FOR APPLIED TECHNOLOGY

November 25, 1966 / Volume 41, Number 22

U.S. Government

RESEARCH AND DEVELOPMENT REPORTS

Published semi-monthly by the Clearinghouse for Federal Scientific and Technical Information. Annual subscription $30.00 ($37.50 foreign). Single copy $2.25. Domestic and foreign air mail charges will be quoted on request. Make remittance payable to National Bureau of Standards—CFSTI and mail either to a U.S. Department of Commerce Field Office or to the Clearinghouse, Springfield, Va., 22151. Address changes should be sent to the Clearinghouse.

PURPOSE

U.S. Government Research & Development Reports (USGRDR) announces the availability of selected new reports of U.S. Government-sponsored R & D released by the Department of Defense, the Atomic Energy Commission, National Aeronautics & Space Administration, and other agencies. It also lists current Government-sponsored R & D projects.

TO ORDER REPORTS

With few exceptions, reports announced herein are available to the public from the Clearinghouse. Order reports by the accession/report number (stock number) given on the first line of each entry. Order from the Clearinghouse, U.S. Department of Commerce, Springfield, Va. 22151, or from any Department of Commerce Field Office (listed on inside back cover). Prices for hard copy (HC) and microfiche (MF) are given in the entry. Prepayment is required unless purchases are to be charged to Clearinghouse deposit accounts. Make check or money order payable to National Bureau of Standards—CFSTI. When reports are announced as available from an organization other than the Clearinghouse, order from that source.

INDEX

All entries in USGRDR are indexed in the *Government-Wide Index to Federal Research & Development Reports (GWI)* published semi-monthly and sold on subscription by the Clearinghouse at $22.00 a year ($27.50 foreign). Single copy $1.75. Indexing data from recent issues of announcement journals of the Atomic Energy Commission, National Aeronautics and Space Administration, and Defense Documentation Center are also included in this index to provide a single reference guide to new unclassified Government-sponsored research and development in the physical sciences, engineering, and related technology.

U.S. DEPARTMENT OF COMMERCE
John T. Connor, Secretary

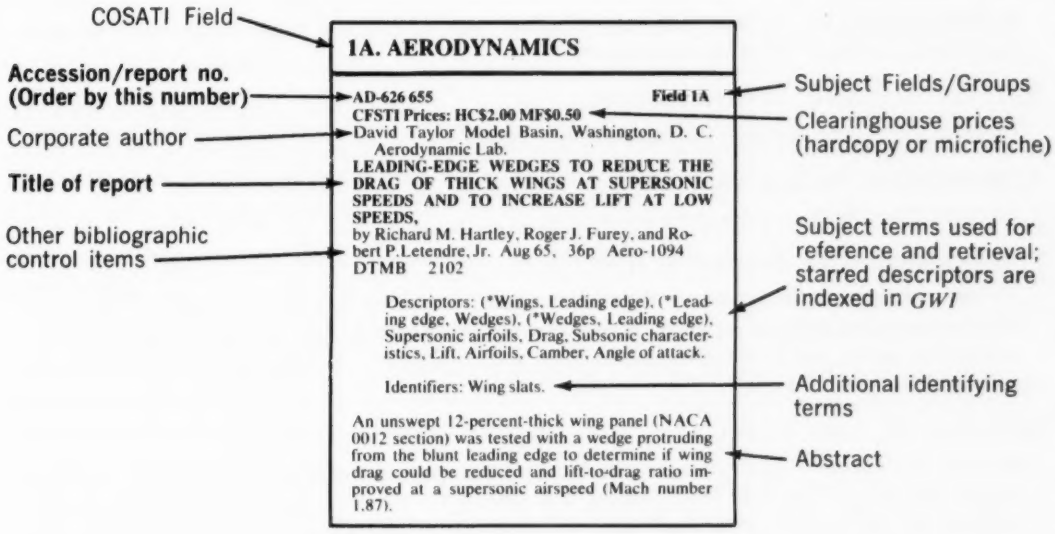
CLEARINGHOUSE FOR FEDERAL SCIENTIFIC
AND TECHNICAL INFORMATION
Springfield, Va. 22151
Bernard M. Fry, Director

Contents may be printed freely. Mention of source will be appreciated.
Use of funds for this publication approved by the Director of the Bureau of Budget, June 22, 1966.

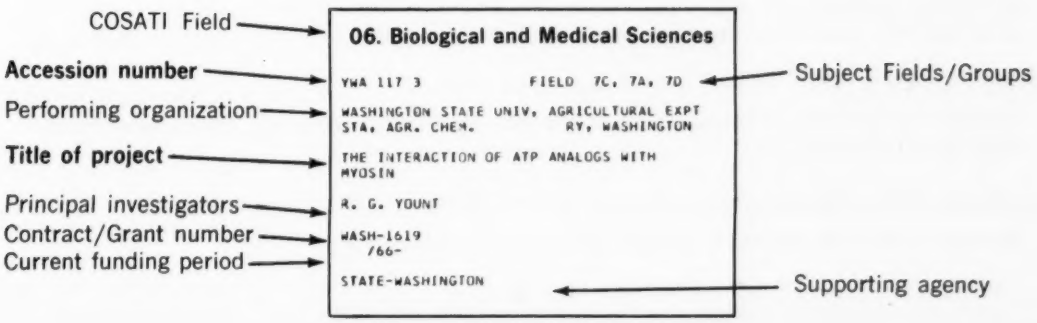
USGRDR FORMAT

Entries are arranged under 22 subject categories called FIELDS. In the entry, subcategories called GROUPS and occasionally sub-groupings are also indicated. This system was adopted by the Committee on Scientific and Technical Information (COSATI) of the Federal Council on Science and Technology. The COSATI Subject Category List, AD 612 200, is available from the Clearinghouse at $1.00. Documents are listed alphanumerically (that is, alphabetic data precedes numerical data) by accession/report number. Key segments of information contained in the entries are identified diagrammatically below.

● RESEARCH & DEVELOPMENT REPORTS


COSATI Field
1A. AERODYNAMICS
Accession/report no. (Order by this number)
AD-626 655
Field 1A
Subject Fields/Groups
CFSTI Prices: HC$2.00 MF$0.50
Clearinghouse prices (hardcopy or microfiche)
Corporate author
David Taylor Model Basin, Washington, D. C. Aerodynamic Lab.
Title of report
LEADING-EDGE WEDGES TO REDUCE THE DRAG OF THICK WINGS AT SUPERSONIC SPEEDS AND TO INCREASE LIFT AT LOW SPEEDS,
Other bibliographic control items
by Richard M. Hartley, Roger J. Furey, and Robert P. Letendre, Jr. Aug 65, 36p Aero-1094 DTMB 2102
Subject terms used for reference and retrieval; starred descriptors are indexed in GWI
Descriptors: (*Wings, Leading edge), (*Leading edge, Wedges), (*Wedges, Leading edge), Supersonic airfoils, Drag, Subsonic characteristics, Lift, Airfoils, Camber, Angle of attack.
Identifiers: Wing slats.
Additional identifying terms
An unswept 12-percent-thick wing panel (NACA 0012 section) was tested with a wedge protruding from the blunt leading edge to determine if wing drag could be reduced and lift-to-drag ratio improved at a supersonic airspeed (Mach number 1.87).
Abstract

● CURRENT R & D PROJECTS



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01 AERONAUTICS 1
Includes aerodynamics; aeronautics; aircraft; aircraft flight control and instrumentation; and air facilities.

02 AGRICULTURE 8
Includes agricultural chemistry; agricultural economics; agricultural engineering; agronomy and horticulture; animal husbandry; and forestry.

03 ASTRONOMY AND ASTROPHYSICS 8
Includes astronomy; astrophysics; and celestial mechanics.

04 ATMOSPHERIC SCIENCES 15
Includes atmospheric physics and meteorology.

05 BEHAVIORAL AND SOCIAL SCIENCES 23
Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology.

06 BIOLOGICAL AND MEDICAL SCIENCES 45
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Includes conversion techniques; power sources; and energy storage.

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11	MATERIALS Includes adhesives and seals; ceramics, refractories, and glasses; coatings, colorants, and finishes; composite materials; fibers and textiles; metallurgy and metallography; miscellaneous materials; oils, lubricants, and hydraulic fluids; plastics; rubbers; solvents, cleaners, and abrasives; and wood and paper products.	119
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special ANNOUNCEMENTS

NASA TAPES CONVERTED TO CLEARINGHOUSE FORMAT

A set of computer programs compiled at the Clearinghouse has eliminated considerable duplication of activity in announcing NASA-generated research and development reports to industry and the public. The computer programs reformat tape records previously used in preparation of NASA's Scientific and Technical Aerospace Reports (STAR). The tapes are thereby automatically made compatible with the standard Clearinghouse tape format, and codes to produce upper and lower case text are inserted according to a set of program rules. (Until a more sophisticated set of editing rules can be programmed, certain typographical errors will occur, such as Ussr, Rca, etc.)

The converted NASA records are merged with the data entered into the Clearinghouse system on punched paper tape, and further manipulation of the combined data produces U. S. Government Research and Development Reports and Government Wide Index. In the near future, similar computer conversion will be applied to data supplied by the Atomic Energy Commission for AEC-generated reports previously announced in Nuclear Science Abstracts.

CURRENT R and D SECTION TO BE DISCONTINUED

The Clearinghouse will suspend publication of the 'Current Research and Development Projects' section after the December 25, 1966, issue of USGRDR.

The present concept of publishing information on unclassified research and development in progress is being restudied by the Clearinghouse in an effort to determine the best way for expanding and improving the format for announcement to the industrial and scientific community.

While the study is underway, information on such research can be obtained from the Science Information Exchange of the Smithsonian Institution, where Federal agencies report their new research projects.

RESEARCH highlights

Reports of current high industrial interest

Categories

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Engineering and Construction

PAPERS PUBLISHED ON ELECTRONICS IN HIGHWAY ENGINEERING

(Order Stock No. PB-173 173 Conference on Improved Highway Engineering Productivity, HC $6.00/MF $1.25.)

Eighteen papers presented at the Conference on Improved Highway Engineering Productivity held at Columbus, Ohio, May 3-4, 1966, have been published by the U.S. Department of Commerce, Bureau of Public Roads. The papers cover aspects of applied electronics in highway transportation, specifically in the fields of highway engineering, administration, and communications. Representatives from State highway departments, universities, research organizations, industry, and specialists from the Bureau of Public Roads presented papers and participated in panel discussions. The papers range over a wide spectrum of applied electronics, including sonics and ultrasonics, computer applications and developments, optical character recognition and reading, and stereo-plotting. Others deal with new developments in professional preparation of engineers and in other aspects of highway transportation. The conference was the latest in a series held for the past several years on Improved Highway Engineering Productivity (IHEP). It was sponsored by the Subcommittee on Electronics of the American Association of State Highway Officials (AASHO) in cooperation with the Bureau of Public Roads and the Ohio Department of Highways.

Metalworking and Metalforming

ARMY ISSUES MACHING DATA MANUAL

(Order Stock No. AD-636 106 Machining Data Handbook, HC $9.00/MF $2.50.)

A machining data manual now available from the Clearinghouse contains condensed and integrated information for various machining operations used in the manufacture of Army material. Since practically all commercial materials and operations are used by the Army, the data presented is useful to other Government services as well as to industry in general. The manual was compiled by Metcut Research Associates, Cincinnati, for the Army's Materiel Command. It is designed to aid supervisors, engineers, designers, planners, production specialists, and operating personnel associated with manufacturing facilities. Machining information was obtained from a thorough search of the literature and from input by industry and the Metal Cutting Advisory Committee. Machining data furnished by industry is currently being used in production operations, much of it taken from manuals provided by the standards departments of cooperating companies. The manual is in eleven Sections: Machining Operations; Tool Geometry; Cutting Fluids; Electrical, Chemical, Special Mechanical and Optical Machining Processes; Supplemental Machining Data and Information; Economics in Machining; Instructions in Machining; Surface Finish; Numerical Control; Machining Standards; and Sources of Machining Data.

HIGH-ENERGY RATE METALFORMING SHOWS GREAT POTENTIAL

(Order Stock No. AD-637 799 Center for High Energy Forming, First Annual Report, HC $7.65/MF $2.00.)

The Center for High Energy Forming, a joint effort of the Martin Company and the University of Denver, has published its first annual report on the progress made in the coupling of science and technology in using this advanced fabrication technique that shows such great potential. The Center notes that there are many types of high-energy forming, differing from each other only in the nature of the energy source. For instance, explosive forming, electrohydraulic forming, electromagnetic forming, and explosive gas forming. The first type, explosive forming, has almost unlimited growth potential, according to the Center's report. It is particularly well adapted to the limited production of large parts of high-strength materials which require amounts of force and energy that exceed the capability of conventional equipment. Since many defense needs exist today for such applications, the initial work of the Center's program was directed toward explosive forming. The Center's report contains surveys of the state-of-the-art in shock hardening of metals, the dynamic deformation behavior of metals, and a review of experimental techniques for measuring high velocity metals, displacements, and high intensity, short duration pressures. It includes information on the significant analytical work done at the Center on the large dynamic plastic deformation of metal blanks under impulsive loading.

It also furnishes papers on the seminar talks given by members of the Center during the first year of operation, as well as an account of the computer program established for information storage and retrieval.

BATTELLE SURVEYS BERYLLIUM FABRICATION TECHNOLOGY

(Order Stock No. AD-637 714 The Fabrication of Beryllium, Volume I: A Survey of Current Technology, HC $4.00/MF $1.00.)

A Battelle state-of-the-art survey of current technology summarizes techniques for fabricating beryllium into component and hardware parts, mainly for aerospace use. Because of its light weight, rigidity, and ability to absorb heat, beryllium is of great interest to the aircraft and aerospace industries in general. Disadvantages of the metal are its poor ductility at room temperature, and lack of useful phase transformation, making it difficult to fabricate. Current research is under way to produce sound castings by melting in vacuum, using a bottom-pour furnace and a graphite mold lined with alumina. Relatively sound castings with relatively fine columnar grains are being produced by this method, but research is continuing. Battelle's survey lists the available grades of beryllium and its alloys, and describes plastic deformation processes, powder metallurgy pressing and casting, machining operations, postfabrication treatments, and joining methods. It describes the various applications of the metal and its alloys in systems components, and briefly covers health and safety requirements in working with beryllium. Five additional volumes covering beryllium alloys are being issued, and will be announced by the Clearinghouse as they are received.

Plastics

CLEARINGHOUSE ISSUES REVIEW OF FILAMENT-WOUND CONSTRUCTION

(Order Stock No. OTR-140 Filament-Wound Construction, in HC only $1.00.)

The latest Clearinghouse technology review prepared for industry concerns the fabrication of structures having a high strength-to-weight ratio, primarily glass fiber-reinforced plastics. Filament winding of reinforced plastics is now widely used in the space program, but experts see the technology expanding to embrace a variety of commercial applications. Essentially, the fabrication method consists in spinning threadlike filaments to form the desired configuration of resin-impregnated structures. This relatively new technique came about when the space and defense programs, aircraft and chemical corporations, oceanographers, and other segments of the National industrial complex began to demand new materials with properties markedly superior to conventional structural materials such as steel and aluminum alloys.

Scientists and engineers of the Government and its contractors actively pursue the development of high-strength, lightweight, and noncorrosive materials

made of composites which no single material can offer. For instance, fibers, filaments, and steel whiskers as reinforcing materials in a dissimilar matrix can greatly increase a structure's strength while reducing its weight by as much as 80 percent. Materials that rust or oxidize can be replaced with glass fiber-reinforced plastics and other noncorrosive composites that are able to endure hostile environments.

Among the structures with such favorable properties now being produced are filament-wound pressure vessels, deep-submergence manned vehicles, aircraft components, and esoteric configurations such as rocket motor cases. All of these have a high strength-to-weight ratio. Filaments now used in their fabrication are mainly glass fibers in plastics of one type or another, but boron carbide and many other materials of low density, high modulus of elasticity, and with great tensile and flexural strength are being investigated.

After surveying Government RDT and E reports for the state-of-the-art, the Clearinghouse has published Filament-Wound Construction -- highlights of significant technical information for the attention of the industrial community. Dealing with glass fiber-reinforced plastics in the main, the reports reviewed may offer ideas for materials and product development.

PROCESSING PLANT FOR IRRADIATED WOOD-PLASTICS EVALUATED

(Order Stock No. KLX-1876 Engineering and Evaluation Study for the Manufacture of Wood-Plastic Composites, HC $2.25/MF $1.25.)

A pilot plant facility for the processing of gamma-irradiated wood-plastic composites (WPC) can be constructed based on the research data we now have at hand, according to a study made for the Atomic Energy Commission by Vitro Engineering. Upon the completion of a product processing development effort, the pilot facility then should have semi-production capability wherein sufficient quantities of WPC may be manufactured for test marketing of a specific product. Earlier surveys made for the AEC indicate many markets for this superior new material -- a wood impregnated with a liquid chemical, then subjected to a radionuclide source to convert it to a solid, polymer-reinforced wood-plastic. The end product is tough and abrasion resistant, and it has great compression, shear, and static bending strengths. It can be made in many colors with all the desirable characteristics of wood plus the strength and moisture resistance of plastics.

Vitro indicates that large scale irradiation tests performed by Lockheed-Georgia at their AEC-sponsored Dawsonville facility supply almost all of the outstanding data necessary to design a semi-production or full production facility. The plant would be capable of turning out 3000 lb/hr or more of 4x8 ft cobalt-60 irradiated composites. The total product cost per bd/ft would be 95 cents, assuming average wood costs of 35 cents/bd ft (less marketing cost and profit). Because of the possible temperature problems involved in the polymerization of monomers such as vinyl acetate and styrene-acrylonitrile, Vitro recommends that the pilot facility stick with methyl methacrylate-WPC. Capital

investment for such a facility would be an estimated $1,160,000; source cost using cobalt-60, not including first year replenishment, would be $704,000. Operating costs per year would be $830,650.

The Atomic Energy Commission has sponsored several other studies on irradiated wood-plastic composites which are available from the Clearinghouse. Stock Nos. and Title with a brief description follow:

TID-22774 Commercialization of the Process of Manufacturing Radiation-Produced Plastic Impregnated Wood in the Southern Region, HC $1.25/MF 75 cents, a survey by the Southern Interstate Nuclear Board which shows that over 20,000 firms in the 17 states in the southern region of the U.S. have potential use of WPC;

NYO-3569-1 Commercialization Studies on Wood-Plastic Combinations Process, HC $1.75/MF $1.00, a survey by the Western New York Nuclear Research Center of the potential for WPC in the Northeast, evaluating the best regions for processing facilities and the most promising products for marketing;

TID-21434 Technical and Economic Considerations for an Irradiated Wood-Plastic Material, in HC only, $1.00, a survey by Arthur D. Little Inc. that points to at least six major markets representing a $1-2 billion industry having a potential for highly profitable uses for WPC;

ORO-628 Preparation of Wood-Plastic Combinations Using Gamma Radiation to Induce Polymerization, in HC only, $4.00, a report on the pioneering work of West Virginia University on the different monomers for WPC; and

ORNL-11C-7 Proceedings of Information Meeting on Irradiated Wood-Plastic Materials, HC $2.00/MF 75 cents, containing papers presented at the Sept. 1965 symposium held at Oak Ridge National Laboratory on topics such as basic research on WPC, its commercial future, and commercial production.

PLASTEC MAKES STATE-OF-THE-ART SURVEY OF THERMOPLASTICS

(Order Stock No. AD-637 721 Fiber Reinforced Thermoplastics: Applications, Molding Techniques, and Performance Data, HC $3.00/MF 75 cents.)

The Plastics Technical Evaluation Center has prepared a state-of-the-art survey of fiber reinforced thermoplastics (RTP) molding that contains procedures and performance data to assist the engineer-designer in selecting the appropriate type of RTP to fit his needs. PLASTEC's report notes that the military has many applications for plastics which perform under specific adverse conditions encountered during storage, shipping, and service. It indicates that RTP should be considered for such uses when conventional thermoplastics are not acceptable. With the development of improved methods for combining fibers and resin for injection molding, there is an expanding interest in RTP products because of its higher tensile, compressive, flexural, shear and other strengths; higher heat distortion

temperatures; better low temperature impact strength; less molding shrinkage, better dimensional stability after molding; lower thermal dimensional change; and less creep or cold flow. According to PLASTEC, these qualities have been verified by experience gained through the molding of many types of industrial and military components over the past 10 years at the Picatinny Arsenal Plastics Laboratory.

Materials chiefly applicable to the process are glass and asbestos fibers, ABS, acetals, acrylics, nylons, polycarbonates, polyethylenes, polypropylenes, styrenes, fluorocarbons, chlorinated polyethers, urethanes, polysulfones, vinyls, and lubricated thermoplastics. PLASTEC's report contains data on the properties of resin/reinforcement formulations furnished by a number of suppliers. It also includes 53 references and an extensive supplemental bibliography. Appendixes cover patent history, a listing of specifications pertaining to RTP, and a list of known suppliers of RTP materials.

Testing, Analysis

HOW TO CONDUCT SENSITIVITY EXPERIMENTS

(Order Stock No. N66-26546 The Design and Analysis of Sensitivity Experiments, in HC only, $5.00 a set.)

A two-volume manual compiled by Rocketdyne classifies types of sensitivity problems to aid experimenters in the selection of an appropriate procedure for designing or analyzing a sensitivity experiment. The manual assists the experimenter in providing a clear formulation of his objectives and the assumptions and constraints which underlie the testing. The authors include all recently developed design and analysis procedures which appear to have merit for general applications, plus those methods which have already found wide use in the field. Since sensitivity testing at present is conducted using familiar experimental design and analysis techniques often unknown to the experimenter and in many cases relatively inefficient, this manual introduces newer and more effective methods. Experimental designs and analysis procedures are separated into different sections since in many cases several methods of analysis can be used in conjunction with a single design, and vice versa. This separation will permit the user to take full advantage of the many combinations at his disposal.

MANUAL ISSUED FOR PROCESSING OF RADIATION COUNTING DATA

(Order Stock No. NAS-NS-3109 Processing Counting Data, HC $1.75/ MF $1.00.)

Lawrence Radiation Laboratory has published a handy reference manual for processing of counting data. The monograph defines counting data as a term used to describe the great variety of results of measurements on amount and kind of radiation emanating from a radioactive sample. Counting data are taken as a function of time after a certain preassigned zero time in terms of events

per unit time. Many instruments are used to accumulate such data, interpretation and use of the data involving a number of complications, many of a statistical nature.

SANDIA UPDATES STANDARD FOR ENVIRONMENTAL TESTING

(Order Stock No. SC-4452D(M) Sandia Corporation Standard Environmental Test Methods, superseding SC-4452C(M) of July 1964, HC $4.00/MF 75 cents.)

Sandia Corporation's Standard Environmental Test Methods publication has been updated to June 1966. The document covers the instrumentation, equipment, and methods to be used in conducting environmental tests on Sandia Corporation components. Material in the document is intended for use by a wide variety of technical personnel of different educational backgrounds, experience, and interests. While it is pointed especially toward the testing of components, some of the recommendations can be applied to test of complete systems as well. Much of the material is intended to provide guidance to those actively involved in the performance of environmental tests. It fills a gap that exists because there are no generally recognized standards governing the conduct of environmental testing. According to Sandia, those who are in any way involved with specifying, performing, or evaluating environmental tests should be aware of the document's contents. Design, production, and quality engineers can extend the usefulness of environmental testing as a tool to serve their individual needs by using material and by calling on test engineers for assistance. There are sections devoted to each of the most commonly encountered kinds of environmental tests, such as temperature, humidity, mechanical shock, sinusoidal vibration, and acoustic vibration tests. Development engineers and others responsible for the preparation of test specifications will find that the suggestions offered will help avoid ambiguities and impractical test conditions and tolerances.

RESEARCH & DEVELOPMENT REPORTS

1. AERONAUTICS

N66-29374 **Field 1**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
RECENT RESEARCH RESULTS IN THE AERODYNAMICS OF SUPERSONIC VEHICLES.
by R. V. Harris Jr, O. A. Morris, and A. W. Robins. 1965, 20p NASA-TM-X-56865
Presented At The Aiaa/ Raes/jsass Design And Technol. Meeting, Los Angeles, 15-18 Nov. 1965

Descriptors: *Aerodynamic characteristics, *Interference drag, *Supersonic aircraft, *Wave drag, Aerodynamic, Aircraft, Characteristic, Cruise, Design, Drag, Effect, Efficiency, Interference, Lift, Performance, Reflex, Scat, Supersonic, Technique, Vehicle, Wave, Wing, Wrap.

For abstract, see S 04 16.

1A. AERODYNAMICS

AD-453 315 **Field 1A**
CFSTI Price: HC$3.60
Royal Aircraft Establishment, Farnborough (England).
THE STATIC PRESSURE DISTRIBUTION AROUND A CIRCULAR JET EXHAUSTING NORMALLY FROM A PLANE WALL INTO AN AIRSTREAM,
by L. J. S. Bradbury, and M. N. Wood. Aug 64, 40p Technical note TN-AERO-2978

Descriptors: (*Vertical take-off planes, Lift), (*Jets, Axially symmetric flow), Pressure, Distribution, Boundary layer, Thickness, Reynolds number, Aerodynamic characteristics, Wings, Wind tunnel models, Velocity, Measurement, Interference.

Measurements have been made of the static pressure distribution on the wall around a circular jet exhausting normally from one wall of a wind tunnel into the mainstream flow through the tunnel. The measurements show the way in which the pressure distributions vary with the ratio of jet to free-stream velocity and also show the regions on the wall which contribute most to the overall suction force on the wall. These overall suction forces are shown to be of the right order of magnitude to account for the lift loss observed on models of direct jet lift VTOL aircraft. Theoretical work on the problem is briefly discussed and it is shown that a particularly simple model of the flow which has previously been suggested on a number of occasions is not really adequate. Some details of an alternative model which is proving more successful are given. (Author)

AD-640 209 **Field 1A**
CFSTI Prices: HC$4.00 MF$1.00
Toronto Univ. (Ontario).
THE LIGHT-LINE-TETHERING TECHNIQUE FOR DETERMINING THE AERODYNAMIC DERIVATIVES OF AN AIR CUSHION VEHICLE.
Final rept., Oct 60-May 65,
by G. Kurylowich. Jun 66, 133p
Contract AF 33 (657)-8451
Proj. AF-8219
Task 821907
AFFDL-TR-65-159

Descriptors: (*Ground effect machines, Aerodynamic characteristics), Feasibility studies, Oscillation, Experimental design, Canada Mooring, Flight testing, Captive tests.

Identifiers: Tethering.

A complete feasibility study was performed on a new technique for determining ACV aerodynamic derivatives. A circular track simulated 'ground' while the vehicle, tethered to a centerpost by means of a light cable, flew a circular flight path above the track surface. A step on the 'ground' perturbed the vehicle from equilibrium and the resulting oscillations were recorded by a movie camera. The results obtained indicated that many derivatives were functions of height. Although scatter in the data permitted a qualitative study only, it was concluded that the scatter resulted from random errors in the recorded time histories and the manner in which the cable was attached to the vehicle. By making certain improvements in the experimental design and apparatus (especially using a larger track) it was concluded that all derivatives could be obtained with satisfactory precision with this technique. (Author)

AD-640 339 **Field 1A, 1C**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Cincinnati, Ohio. Advanced Engine and Technology Dept.
FULL-SCALE WINDTUNNEL TEST PROGRAM.
Dec 63, 37p Rept. no. 135
Contract DA-44-177-TC-715
Rept. on XV-5A Lift Fan Research Aircraft Program.

Descriptors: (*Vertical take-off planes, Flight testing), (*Research planes, Flight testing), Wind tunnels, Aerodynamic characteristics, Structural properties, Instrumentation, Performance (Engineering).

Identifiers: V-5 aircraft.

The report describes the detailed plans for the full-scale windtunnel testing of the U. S. Army XV-5A Lift-Fan Research Aircraft. The test program is designed to investigate the aerodynamic and structural behavior of the arcraft during simulated transition, conversion and low speed conventional flight. Detailed test schedules, instrumentation and data requirements and operational limits are described for the tests that will be performed at the NASA - Ames Research Center in the full-scale, 40 by 80 foot, windtunnel facilities. (Author)

N66-27042 **Field 1A**
CFSTI Prices HC$3.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EFFECTS OF WING PLANFORM ON THE AERODYNAMIC CHARACTERISTICS OF A WING-BODY-TAIL MODEL AT MACH NUMBERS 1.57, 2.16, AND 2.87.
by L. S. Jernell, and R. L. Mc kinney. Mar 65, 46p NASA-TM-X-1065

Descriptors: *Aerodynamic characteristics, *Sweptback wing, *Wind tunnel model, *Wing planform, Aerodynamic, Characteristics, Configuration, Drag, Edge, Leading, Lift, Model, Planform, Stability, Sweepback, Testing, Trailing, Tunnel, Wind, Wing.

For abstract, see S 04 15.

N66-27043 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EFFECTS OF CORNER RADIUS ON STAGNATION-POINT VELOCITY GRADIENTS ON BLUNT AXISYMMETRIC BODIES.
by E. M. Sullivan, and E. V. Zoby. Mar 65, 17p NASA-TM-X-1067

Descriptors: *Blunt body, *Stagnation point, *Velocity profile, Angle of attack, Axisymmetry, Blunt, Body, Corner, Field, Flow, Gradient, Model, Point, Profile, Radius, Ratio, Stagnation, Testing, Velocity.

For abstract, see S 04 15.

N66-27055 **Field 1A**
CFSTI Prices HC$8.72 MF$2.75
Lockheed Missiles And Space Co., Sunnyvale, Calif.
STUDY OF AEROTHERMODYNAMIC PHENOMENA ASSOCIATED WITH REENTRY OF MANNED SPACECRAFT FINAL REPORT, NOV. 1964 - MAY 1966.
by J. H. Chin, L. F. Hearne, and L. W. Woodruff. May 66, 572p NASA-CR-65368, Y-78-66-1
Contract NAS9-3531

Descriptors: *Aerothermodynamics, *Inviscid flow, *Manned spacecraft, *Spacecraft reentry, Aerothermal, Apollo project, Calorimeter, Capacitance, Computer, Convection, Environment, Flow, Heat transfer, Heating, Inviscid, Program, Radiative, Sensor, Wall.

For abstract, see S 04 15.

N66-27063 **Field 1A**
CFSTI Prices HC$5.00 MF$1.00
Douglas Aircraft Co., Inc., Santa Monica, Calif.
SPECTRA AND SPACE-TIME CORRELATIONS OF THE FLUCTUATING PRESSURES AT A WALL BENEATH A SUPERSONIC TURBULENT BOUNDARY LAYER PERTURBED BY STEPS AND SHOCK WAVES.
by C. M. Ailman, and W. V. Speaker. May 66, 150p NASA-CR-486
Contract NASW-932

Descriptors: *Pressure distribution, *Shock wave, *Space-time function, *Turbulent boundary layer, Boundary, Correlation, Distribution, Energy, Frequency, Function, Graph, Layer, Perturbation, Power, Pressure, Shock, Space, Spectrum, Supersonic, Time, Turbulence, Wall, Wave.

For abstract, see S 04 15.

N66-27074 **Field 1A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
RESUME OF RECENT PARAWING RESEARCH.
by D. R. Croom, F. M. Rogallo, and W. C. Sleeman Jr. 1965, 38p NASA-TM-X-56747
Presented At The Course On Aerodyn. Deceleration, Minn. Univ., Minneapolis, 8 Jul. 1965

Descriptors: *Aerodynamic characteristics, *Flexible wing, *Paraglider, Aerodynamic, Characteristics, Configuration, Conical, Cylinder, Flexible, Gliding, Lifting, Parachute, Research, Surface, Wing.

For abstract, see S 04 15.

N66-27081 **Field 1A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
A SYSTEMATIC STUDY OF THE FACTORS CONTRIBUTING TO POST-STALL LONGITUDINAL STABILITY OF T- TAIL TRANSPORT CONFIGURATIONS.
by E. J. Ray, and R. T. Taylor. 1965, 30p NASA-TM-X-56882
Presented At The Aiaa Aircraft Design And Technol. Meeting, Los Angeles, 15-18 Nov. 1965

Descriptors: *Longitudinal stability, *T tail surface, *Transport aircraft, *Wind tunnel, Aircraft, Aspect, Control, Flap, Nacelle, Pylon, Ratio, Stall, Surface, Tail, Transport, Tunnel, Wind.

For abstract, see S 04 15.

N66-27190 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
METHOD OF COMPUTING THREE DIMENSIONAL FLOWS PAST BODIES AFTER SHOCK-WAVE PASSAGE.
Metod Rascheta Prostranstvennogo Obtekaniya Tel S Otoshedshey Udarnoy Volnoy
by G. F. Telenin, and G. P. Tinyakov. 10 Apr 64, 5p NASA-TT-F-8682, ST-AD-10125
Contract NAS5-2078

Transl. Into English From Dokl. Akad. Nauk Sssr, Gidromekhan. (Moscow), V. 154, No. 5, 11 Feb. 1964 P 1056-1058

Descriptors: *Gas dynamics, *Numerical integration, *Shock wave, *Three-dimensional flow, Body, Dimensional, Dynamics, Equation, Flow, Gas, Integration, Numerical, Shock, Solid, Three, Wave.

For abstract, see S 04 15.

N66-27207 **Field 1A**
CFSTI Prices HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
STRUCTURE AND UTILIZATION OF SUPERSONIC FREE JETS IN LOW DENSITY WIND TUNNELS.
by H. Ashkenas, and F. S. Sherman. 1965, 28p NASA-CR-60423
Contracts NAS7-100, NONR-222/45/
Prepared In Cooperation With Calif. Univ., Berkeley

Descriptors: *Free jet, *Inviscid flow, *Low density wind tunnel, *Supersonic jet, *Viscous flow, Boundary, Dissipation, Flow, Free, Heating, Inviscid, Jet, Layer, Low density, Molecular, Stagnation, Supersonic, Tunnel, Viscous, Wind.

For abstract, see S 04 15.

N66-27223 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
ANALOGY OF A HYPERSONIC FLOW PAST THIN BLUNT BODIES WITH AN EXPLOSION.
Ob Analogii S Vzryvom Giperzvukovogo Obtekaniva Tonokogo Prituplennogo Vperedi Tela
by G. G. Chernyy. Aug 63, 7p NASA-TT-F-8619, ST-10034
Contract NAS5-2078
Transl. Into English From Dokl. Akad. Nauk Sssr, Gidromekhan. (Moscow), V. 151, No. 2 P 302-305

Descriptors: *Blunt body, *Explosion, *Hypersonic flow, *Similitude law, Analogy, Blunt, Body, Charge, Cylinder, Distribution, Hypersonic, Law, Pressure, Theory, Thin.

For abstract, see S 04 15.

N66-27313 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
WIND-TUNNEL INVESTIGATION OF SONIC-BOOM CHARACTERISTICS OF A DELTA-WING-BODY COMBINATION AT MACH NUMBERS OF 1.41 AND 2.01.
by O. A. Morris. Jun 66, 21p NASA-TN-D-3455

Descriptors: *Delta wing, *Mach number, *Sonic boom, *Wind tunnel, Boom, Delta, Interference, Lift, Pressure, Signature, Sonic, Tunnel, Wedge, Wind, Wing.

For abstract, see S 04 15.

N66-27493 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
EFFECT OF THE BOUNDARIES OF AN INCOMPRESSIBLE FLUID FLOW ON THE UNSTEADY AERODYNAMIC CHARACTERISTICS OF A PROFILE.
by D. N. Gorelov. May 66, 11p NASA-TT-F-10112
Transl. Into English From Izv. Akad. Nauk Sssr, Otd, Tekhn. Nauk- Mekhan. I Mashinostr. (Moscow), No. 5, 1965 P 157-159

Descriptors: *Aerodynamic characteristics, *Incompressible flow, *Liquid flow, Aerodynamic, Airfoil, Airfoil profile, Boundary, Characteristic, Dimensional, Flow, Fluid, Incompressible, Profile, Solid, Strouhal number, Two, Velocity, Wall.

For abstract, see S 04 15.

N66-27494 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
FRICTION AND WINDAGE LOSSES IN ROTOR BLADE ASSEMBLIES OF RADIAL-FLOW TURBINES OF HELICOPTER AND TRANSPORT GAS TURBINE POWER PLANTS.
O Poteryakh Treniya I Ventilyatsii V Rabochikh Ventsakh Radial'nykh Turbin Vertoletnykh I Transportnykh Gtu
by N. F. Galitskiy. May 66, 16p NASA-TT-F-10118
Transl. Into English From Izv. Vysshikh Uchebn. Zavedenii, Aviats. Tekh. (Kazan), V. 7, No. 4, 1964 P 60-66

Descriptors: *Gas turbine, *Radial flow, *Rotor blade, Aircraft, Blade, Engine, Flow, Friction, Gas, Helicopter, Loss, Radial, Rotor, Transport, Turbine, Wind.

For abstract, see S 04 15.

N66-27505 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
FLIGHT-MEASURED GROUND EFFECT ON A LOW-ASPECT- RATIO OGEE WING INCLUDING A COMPARISON WITH WIND-TUNNEL RESULTS.
by D. G. Koenig, and L. S. Rolls. Jun 66, 30p NASA-TN-D-3431

Descriptors: *Aspect ratio, *Ground effect, *Ogee wing, *Wind tunnel, Aircraft, Angle, Coefficient, Effect, Elevon, Flight, Ground, Lift, Low aspect, Measurement, Ratio, Trim, Tunnel, Wind.

For abstract, see S 04 15.

N66-27731 **Field 1A**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
QUASI-SLENDER BODY THEORY FOR SLOWLY OSCILLATING BODIES OF REVOLUTION IN SUPERSONIC FLOW.
by G. H. Hoffman, and M. F. Platzer. Jun 66, 62p NASA-TN-D-3440

Descriptors: *Body of revolution, *Slender body, *Supersonic flow, Body, Flow, Mach number, Oscillation, Potential, Revolution, Shape, Slender, Supersonic, Theory, Velocity.

For abstract, see S 04 15.

N66-27733 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EFFECT OF BODY CROSS SECTION AND WIDTH-HEIGHT RATIO ON PERFORMANCE OF BODIES AND DELTA-WING- BODY COMBINATIONS AT MACH 6.9.
by A. H. Whitehead Jr. Jun 66, 27p NASA-TN-D-2886

Descriptors: *Aerodynamic characteristics, *Body-wing combination, *Delta wing, *Mach number, *Performance characteristics, Aerodynamic, Body, Characteristic, Combination, Cross section, Delta, Drag, Height, Lift, Pérformance, Ratio, Width, Wing.

For abstract, see S 04 15.

N66-28001 **Field 1A**
CFSTI Prices HC$2.00 MF$0.50
Aeronautical Research Council (Gt. Brit.)
MEASUREMENTS OF THE DIRECT PITCHING-MOMENT DERIVATIVES FOR THREE WING PLANFORMS AT HIGH SUBSONIC SPEEDS.
by J. B. Bratt, W. G. Raymer, and J. E. Townsend. 1965, 41p ARC-R ;M-3419, ARC-16267

Descriptors: *Aerodynamic stability, *Pitching moment, *Wing planform, Aerodynamic, Damping, Delta, Moment, Oscillation, Pitch, Planform, Stability, Subsonic, Swept wing, Tunnel, Wind, Wing.

For abstract, see S 04 15.

N66-28003 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
Aeronautical Research Council (Gt. Brit.)
A ROLL-BALANCE FREE-FLIGHT TEST VEHICLE FOR THE MEASUREMENT OF AILERON ROLLING POWER AND ROLL DAMPING AT M EQUALS 0.8 TO 2.5.
by K. J. Turner. 1965, 24p ARC-CP-679

Descriptors: *Aileron, *Roll control, *Supersonic aircraft, Aircraft, Balance, Control, Damping, Great britain, Model, Roll, Supersonic, Torque, Trajectory, Transonic, Tunnel, Wind.

For abstract, see S 04 15.

N66-28014 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EFFECTS OF WING PLANFORM ON THE AERODYNAMIC CHARACTERISTICS OF A WING-BODY-TAIL MODEL AT MACH NUMBERS 3.96 AND 4.63.
by M. O. Feryn. Jun 66, 27p NASA-TM-X-1242

Descriptors: *Aerodynamic characteristics, *Aircraft configuration, *Supersonic flight, *Wing planform, Aerodynamic, Aircraft, Body, Characteristics, Configuration, Flight, Model, Planform, Reynolds number, Speed, Supersonic, Tail, Test, Tunnel, Wind, Wing.

For abstract, see S 04 15.

N66-28128 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
Norges Tekniske Hoegskole, Trondheim.
DRAG AND FLUCTUATING TRANSVERSE FORCE ON A CYLINDER IN NATURAL WIND.
by I. Holand, and M. Jensen. 1965, 16p

Descriptors: *Circular cylinder, *Drag coefficient, *Wind, Circular, Coefficient, Cylinder, Drag, Fluctuation, Force, Frequency, Nondimensional, Strouhal number, Transverse.

For abstract, see S 04 15.

N66-28541 **Field 1A**
CFSTI Prices HC$2.00 MF$0.50
Aeronautical Research Council (Gt. Brit.)
FORCES ON AEROFOILS WITH BOTH INCIDENCE AND FORWARD SPEED VARYING.
by D. G. Randall. 1965, 30p ARC-R ;M-3414, RAE-TN-STRUCT-357

Descriptors: *Airfoil characteristics, *Incompressible flow, *Two-dimensional flow, Aerodynamic, Airfoil, Characteristics, Dimensional, Equation, Flow, Incompressible, Integral, Inviscid, Solution, Two, Unsteady.

For abstract, see S 04 16.

N66-28566 **Field 1A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.

A STUDY TO DETERMINE EFFECTS OF APPLYING THRUST ON RECOVERY FROM INCIPIENT AND DEVELOPED SPINS FOR FOUR AIRPLANE CONFIGURATIONS.
by S. B. Grafton. Jun 66, 49p NASA-TN-D-3416

Descriptors: *Aerodynamic stability, *Aircraft configuration, *Control surface, *Thrust effect, Aerodynamic, Aircraft, Configuration, Control, Deflection, Delta, Effect, Incipient, Optimal, Oscillation, Recovery, Spin, Surface, Sweep, Thrust, Wing.

For abstract, see S 04 16.

N66-28824 **Field 1A**
CFSTI Prices HC$3.00 MF$0.75
Rice Univ., Houston, Tex. Aero-astronautics Group.
OPTIMUM LIFTING WINGS IN NEWTONIAN FLOW PROGRESS REPORT, JAN. 1 - JUN. 30, 1966.
by A. Miele. 1966, 72p NASA-CR-75781
Contract NGR-44-006-045

Descriptors: *Hypersonic flow, *Lift-drag ratio, *Slender wing, Area, Calculus, Chord, Drag, Flow, Frontal, Hypersonic, Law, Lift, Newton theory, Planform, Ratio, Root, Similarity, Slender, Span, Thickness, Variation, Volume, Wing.

For abstract, see S 04 16.

N66-29067 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
WIND-TUNNEL LIFT INTERFERENCE ON SWEPTBACK WINGS IN RECTANGULAR TEST SECTIONS WITH SLOTTED TOP AND BOTTOM WALLS.
by R. L. Barger, and R. H. Wright. Jun 66, 20p NASA-TR-R-241

Descriptors: *Interference lift, *Lifting surface, *Slotted wind tunnel, *Sweptback wing, Back, Boundary, Interference, Lift, Lifting, Slot, Surface, Sweep, Sweepback, Test, Upwash, Wind tunnel, Wing.

For abstract, see S 04 16.

N66-29210 **Field 1A**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EFFECT OF BODY NOSE BLUNTING, CONTROL PLANFORM AREA, AND LEADING-EDGE BLUNTNESS ON AERODYNAMIC CONTROL OF A 5 DEG SEMIVERTEX CONE AT MACH NUMBER 6.9.
by J. A. Penland. Jun 66, 68p NASA-TN-D-3460

Descriptors: *Blunt body, *Control surface, *Dynamic control, *Hypersonic speed, *Leading edge, Aerodynamic, Blunt, Bluntness, Body, Cone, Control, Direction, Dynamic, Edge, Effect, Hypersonic, Lateral, Leading, Longitudinal, Model, Nose, Planform, Roll, Speed, Stability, Surface, Tunnel, Wind.

For abstract, see S 04 16.

N66-29211 **Field 1A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
A THEORETICAL ANALYSIS OF THE DYNAMIC LATERAL STABILITY AND CONTROL OF A PARAWING VEHICLE.
by P. C. Boisseau, and J. R. Chambers. Jun 66, 47p NASA-TN-D-3461

Descriptors: *Aerodynamic characteristics, *Dynamic stability, *Lateral stability and control, *Paraglider, Aerodynamic, Analysis, Center, Characteristics, Control, Dynamic, Flexible, Gravity, Lateral, Stability, Theoretical, Wing.

For abstract, see S 04 16.

N66-29215 **Field 1A**
CFSTI Prices HC$4.00 MF$0.75
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
STUDY OF SURFACE PITOTS FOR MEASURING TURBULENT SKIN FRICTION AT SUPERSONIC MACH NUMBERS - ADIABATIC WALL.
by E. J. Hopkins, and E. R. Keener. Jul 66, 107p NASA-TN-D-3478

Descriptors: *Adiabat, *Calibration, *Pitot tube, *Skin friction, *Turbulent boundary layer, Boundary, Edge, Flat, Friction, Heat transfer, Layer, Measurement, Pitot, Plate, Pressure, Preston tube, Skin, Speed, Supersonic, Supersonic speed, Surface, Tube, Turbulent, Wall.

For abstract, see S 04 16.

N66-29294 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
Washington Univ., Seattle. Dept. Of Aeronautical Engineering.
EXPERIMENTAL AND THEORETICAL INVESTIGATION OF WIND TUNNEL GEOMETRY, EMPHASIZING FACTORS PERTINENT TO V/STOL VEHICLES TESTING PROGRESS REPORT NO. 3, SEP. 16, 1965 - MAR. 15, 1966.
by R. G. Joppa. 1 Jun 66, 9p NASA-CR-75822
Contract NGR-48-002-010

Descriptors: *Flow field, *V/stol aircraft, *Wind tunnel, Aircraft, Field, Flow, Lift, Method, Ring, Trajectory, Tunnel, V/stol, Vortex, Wake, Wind.

For abstract, see S 04 16.

N66-29389 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
A SIMULATOR STUDY OF T-TAIL AIRCRAFT IN DEEP STALL CONDITIONS.
by L. J. Lina, and M. T. Moul. 1965, 15p NASA-TM-X-56806
Presented At The Aiaa/raes/jsass Aircraft Design And Technol. Meeting, Los Angeles, 15-18 Nov. 1965

Descriptors: *Aircraft performance, *Recovery, *Simulation, *T tail surface, Aerodynamic, Aircraft, Angle of attack, Characteristics, Damping, Deep, Drag, Lift, Moment, Performance, Pilot, Pitch, Stall, Surface, T shape, Tail, Thrust.

For abstract, see S 04 16.

N66-29417 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
HYPERSONIC FLOW AROUND A CIRCULAR CONE AT AN ANGLE OF ATTACK.
Giperzvukovoye Obtekaniye Kryglogo Konusa Pod Uglom Ataki
by YA. G.Sapunkov. Mar 63, 7p NASA-TT-F-8414
Transl. Into English From Prikl. Mat. I. Mekh. (Ussr), No. 1, 1963 P 190-192

Descriptors: *Angle of attack, *Approximation method, *Circular cone, *Gas flow, *Hypersonic flow, Angle, Approximation, Attack, Circular, Cone, First, Flow, Gas, Hypersonic, Method, Solution.

For abstract, see S 04 16.

N66-29461 **Field 1A**
CFSTI Prices HC$6.00 MF$1.25
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
PERFORMANCE, STABILITY, AND CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF THREE V/STOL AIRPLANE CONFIGURATIONS WITH WINGS OF VARIABLE SWEEP.
by W. J. Alford Jr. and A. A. Luoma. Oct 60, 223p NASA-TM-X-321

Descriptors: *Stability and control, *Swept wing, *Transonic speed, *V/stol aircraft, Aircraft, Angle, Attack, Configuration, Control, Drag, Lift, Mach number, Performance, Ratio, Speed, Stability, Transonic, V/stol, Variable.

For abstract, see S 04 16.

N66-29466 **Field 1A**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
LONGITUDINAL AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A V/STOL AIRPLANE CONFIGURATION WITH A FIXED DELTA WING HAVING AUXILIARY VARIABLE-SWEEP OUTBOARD PANELS.
by A. A. Luoma. Dec 61, 86p NASA-TM-X-661

Descriptors: *Aerodynamic characteristics, *Delta wing, *Fixed-wing aircraft, *Transonic speed, *V/stol aircraft, *Variable sweep, Aerodynamic, Aircraft, Auxiliary, Characteristics, Configuration, Control, Delta, Fixed, Landing, Longitudinal, Outboard, Panel, Short, Speed, Stability, Sweep, Takeoff, Transonic, V/stol, Variable, Vertical, Wing.

For abstract, see S 04 16.

N66-29467 **Field 1A**
CFSTI Prices HC$4.00 MF$0.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
LONGITUDINAL AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF TWO V/STOL AIRPLANE CONFIGURATIONS WITH SKEWED AND VARIABLE-SWEEP WINGS.
by A. A. Louma. Apr 61, 106p NASA-TM-X-527

Descriptors: *Aerodynamic characteristics, *Stability and control, *Transonic speed, *V/stol aircraft, *Variable sweep, *Wing body, Aerodynamic, Aircraft, Angle, Body, Characteristics, Control, Landing, Longitudinal, Pressure, Short, Skew, Speed, Stability, Sweep, Takeoff, Transonic, Tunnel, V/stol, Variable, Vertical, Wing.

For abstract, see S 04 16.

N66-29712 **Field 1A**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
AN INVESTIGATION OF THE DYNAMIC LATERAL STABILITY AND CONTROL OF A PARAWING VEHICLE.
by J. R. Chambers. May 66, 86p NASA-TM-X-57693

Descriptors: *Aerodynamic stability, *Flexible wing, *Lateral control, *Winged vehicle, Aerodynamics, Aircraft, Control, Dynamics, Flexibility, Glider, Lateral, Stability, Vehicle, Wing.

For abstract, see S 04 16.

N66-36106 **Field 1A**
CFSTI Prices HC$5.00 MF$1.25
Boeing Co., Seattle, Wash.
ANALYSIS OF HYPERSONIC PRESSURE AND HEAT TRANSFER TESTS ON DELTA WINGS WITH LAMINAR AND TURBULENT BOUNDARY LAYERS FINAL REPORT.

by L. B. Doyle, H. D. Fitzsimmons, and A. L. Nagel. Aug 66, 199p NASA-CR-535
Contract NAS1-4301

Descriptors: *Delta wing, *Heat transfer, *Hypersonic wind tunnel, *Laminar boundary layer, *Turbulent boundary layer, Boundary, Delta, Dyna soar project, Hypersonic, Laminar, Layer, Pressure, Test, Tunnel, Turbulent, Wind, Wing.

For abstract, see S 04 21.

N66-36107 **Field 1A**
CFSTI Prices HC$4.00 MF$1.00
Boeing Co., Seattle, Wash.
ANALYSIS OF HYPERSONIC PRESSURE AND HEAT TRANSFER TESTS ON A FLAT PLATE WITH A FLAP AND A DELTA WING WITH BODY, ELEVONS, FINS, AND RUDDERS FINAL REPORT.
by H. L. Giles, and J. W. Thomas. Aug 66, 126p NASA-CR-536
Contract NAS1-4301

Descriptors: *Flow field, *Hypersonic boundary layer, Body, Boundary, Delta, Elevon, Field, Fin, Flap, Flat, Flow, Heat transfer, Interference, Layer, Plate, Separation, Testing, Wing, X- 20 aircraft.

For abstract, see S 04 21.

N66-36108 **Field 1A**
CFSTI Prices HC$4.00 MF$1.00
Boeing Co., Seattle, Wash.
ANALYSIS OF PRESSURE AND HEAT TRANSFER TESTS ON SURFACE ROUGHNESS ELEMENTS WITH LAMINAR AND TURBULENT BOUNDARY LAYERS FINAL REPORT.
by C. L. Jaeck. Aug 66, 146p NASA-CR-537
Contract NAS1-4301

Descriptors: *Heat transfer, *Laminar boundary layer, *Surface roughness, *Turbulent boundary layer, Aerodynamics, Boundary, Element, Flow, Laminar, Layer, Pressure, Roughness, Surface, Turbulent, X- 20 aircraft.

For abstract, see S 04 21.

N66-36119 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
USE OF GRIT-TYPE BOUNDARY-LAYER TRANSITION TRIPS ON WIND-TUNNEL MODELS.
by A. L. Braslow, R. V. Harris Jr, and R. M. Hicks. Sep 66, 20p NASA-TN-D-3579
Contract 126-13-03-22-23
Presented At The Conf. On Aircraft Aerodyn., Langley Sta., Va., 23-25 May 1966

Descriptors: *Boundary layer transition, *Leading edge, *Wind tunnel model, Aerodynamics, Aircraft, Boundary, Conference, Edge, Grit, Layer, Leading, Model, Speed, Subsonic, Supersonic, Transition, Trip, Tunnel, Wind.

For abstract, see S 04 21.

N66-36140 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
BOUNDARY LAYER RELATIONSHIPS RESULTING FROM AN APPROXIMATION OF THE VISCOSITY OF EQUILIBRIUM DISSOCIATING AIR.
Zakonomernosti Pogranichnogo Sloya, Vyteka-Yushchiye Iz Approksimatsii Vyazkosti Ravnov-Esno Dissotsiiruyushchego Vozdukha
by YU. A.Demyanov, and I. N. Murzinov. Sep 66, 9p NASA-TT-F-10292
Transl. Into English From Inzh. Zh. (Ussr), V. 5, No. 5, 1965 P 971-972

Descriptors: *Boundary layer, *Equilibrium flow, *Gas dissociation, *Viscosity, Air, Approximation, Boundary, Dissociation, Enthalpy, Equilibrium, Flow, Friction, Gas, Heat, Layer, Transfer, Velocity, Wall.

For abstract, see S 04 21.

N66-36141 **Field 1A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
AERODYNAMIC DISTURBANCES OF PROFILES IN SUBSONIC STEADY FLOW.
Ob Aerodinamicheskoy Interferentsii Profiley V Dozvukom Nestatsionarnom Potoke
by V. B. Kurzin. Sep 66, 16p NASA-TT-F-10293
Transl. Into English From Izv. Akad. Nauk Sssr, Mekhan. Zhidkosti I Gaza (Ussr), No. 1, 1966 P 117-120

Descriptors: *Aerodynamic force, *Subsonic flow, *Unsteady flow, Acoustic, Aerodynamic, Compressible, Dimensional, Disturbance, Flow, Force, Gas, Incompressible, Oscillation, Profile, Resonance, Subsonic, Two, Unsteady.

For abstract, see S 04 21.

N66-36142 **Field 1A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
METHOD OF CALCULATING THE EFFECT OF A GUST ON AN ARBITRARY THIN WING.
Metod Rascheta Vozdeystviya Poryva Na Proizvol'noye Tonkoye Krylo
by S. M. Belotserkovskiy. Sep 66, 28p NASA-TT-F-10294
Transl. Into English From Izv. Akad. Nauk Sssr, Mekhan. Zhidkosti I Gaza (Ussr), No. 1, 1966 P 51-60

Descriptors: *Gust, *Numerical analysis, *Thin wing, *Unsteady flow, Aerodynamic, Analysis, Calculation, Effect, Flow, Force, Method, Numerical, Thin, Turbulence, Unsteady, Wing.

For abstract, see S 04 21.

N66-36304 **Field 1A**
CFSTI Prices HC$3.00 MF$1.00
Itek Corp., Palo Alto, Calif.
PREDICTED AND MEASURED PERFORMANCE OF TWO FULL-SCALE DUCTED PROPELLERS.
by A. R. Kriebel, and M. R. Mendenhall. Sep 64, 121p NASA-CR-578
Contract NAS2-2647

Descriptors: *Ducted fan, *Shrouded propeller, *Wind tunnel model, Analysis, Angle of attack, Boundary, Data, Distribution, Duct, Fan, Force, Layer, Model, Moment, Performance, Pressure, Propeller, Shroud, Stall, Tunnel, Wind.

For abstract, see S 04 21.

N66-36321 **Field 1A**
CFSTI Prices HC$2.50 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
LARGE-SCALE WIND-TUNNEL TESTS OF A LOW-ASPECT RATIO DELTA-WINGED MODEL EQUIPPED WITH SHARP-EDGED STAKES.
by V. R. Corsiglia, and D. G. Koenig. Sep 66, 51p NASA-TN-D-3621
Contract 720-01-00-01

Descriptors: *Delta wing, *Low aspect ratio wing, *Wind tunnel stability test, Delta, Edge, Landing, Lift, Longitude, Low aspect, Model, Ratio, Sharp, Stability, Strake, Takeoff, Test, Tunnel, Wind, Wing.

For abstract, see S 04 21.

N66-36376 **Field 1A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
METHOD FOR ESTIMATING LIFT INTERFERENCE OF WING-BODY COMBINATIONS AT SUPERSONIC SPEEDS.
by G. E. Kaattari, and J. N. Nielsen. 31 Dec 51, 47p NACA-RM-A51J04

Descriptors: *Interference lift, *Supersonic speed, *Wing body, Aircraft, Body, Boundary, Combination, Estimation, Interference, Layer, Lift, Method, Missile, Moment, Speed, Supersonic, Wing.

For abstract, see S 04 21.

1B. AERONAUTICS

AD-463 204 **Field 1B**
CFSTI Price: HC$1.60
Royal Aircraft Establishment, Farnborough (England).
ASSESSMENT OF CHANGES IN COLLISION RISK OF NORTH ATLANTIC AIR TRAFFIC FROM CHANGES IN THE REPORTED SIGHTING RATE,
by R. T. Robinson. Jan 65, 19p Technical rept. TR-65002

Descriptors: (*Air traffic, Atlantic Ocean), Aviation safety, Analysis, Flight paths, Errors, Frequency, Aviation accidents, Probability, Visual inspection, Target acquisition.

The aim of this study of air traffic on North Atlantic tracks is to examine whether an increase in the reported sighting rate of aircraft, identified as straying from an adjacent track, can be used for estimating a change in lateral collision risk, i.e. in the risk which is due to imperfect track-keeping. It is found that the ratio of the frequency of such sightings to the collision frequency is not large enough to detect even a quite severe change in the collision frequency. (Author)

AD-477 977 **Field 1B, 4B**
CFSTI Prices: HC$7.60 MF$0.75
Royal Aircraft Establishment, Farnborough (England).
CIVIL AIRCRAFT AIRWORTHINESS DATA RECORDING PROGRAMME. SPECIAL EVENTS OF METEOROLOGICAL ORIGIN (NOVEMBER 1963 TO DECEMBER 1964).
Nov 65, 80p TR-65243, CAADRP-TR-3
See also AD-477 988.

Descriptors: (*Civil aviation, Meteorology), (*Commercial planes, Aviation safety), Airborne, Meteorological instruments, Atmospheric temperature, Turbulence, Lightning, Transport planes, Great Britain, Graphics, Data, Jet transport planes, Meteorological parameters.

Continuous trace records of airworthiness data have been taken from a small number of aircraft in normal airline service since October 1962. Throughout the recording period the records have been searched for unusual occurrences, and each one has been studied to determine its nature and, where possible, its cause. This report describes a selection of events of meteorological origin which were found in records taken between November 1963 and December 1964.

AD-477 988 **Field 1B, 4B**
CFSTI Prices: HC$5.60 MF$0.50
Royal Aircraft Establishment, Farnborough (England).

CIVIL AIRCRAFT AIRWORTHINESS DATA RECORDING PROGRAMME. SPECIAL EVENTS OF AN OPERATIONAL NATURE (FEBRUARY 1964 TO DECEMBER 1964).
Nov 65, 51p TR-65242, CAADRP-TR-2
See also AD-477 977.

Descriptors: (*Civil aviation, Meteorology), (*Commercial planes, Aviation safety), Great Britain, Transport planes, Meteorological instruments, Airborne, Graphics, Take-off, Flight speeds, Climbing, Acceleration, Flight control systems, Fog, Clouds, Descent, Aircraft landings, Jet transport planes, Meteorological parameters.

Continuous trace records of airworthiness data have been taken from a small number of aircraft in normal airline service since October 1962. Throughout the recording period the records have been searched for unusual occurrences, and each one has been studied to determine its nature and, where possible, its cause. This report describes a selection of events of an operational nature which were found in records taken between February 1964 and December 1964. (Author)

AD-480 187 **Field 1B**
CFSTI Prices: HC$4.00 MF$1.00
Cornell Aeronautical Lab., Buffalo, N. Y.
FLIGHT EVALUATION OF VARIOUS PHUGOID DYNAMICS AND 1/Th1 FOR THE LANDING-APPROACH TASK.
Final rept., Apr 64-Dec 65,
by Charles Chalk. Dec 65, 145p TC-1921-F-4
Contract AF 33 (615)-1253
Proj. AF-8219
Task 821905

Descriptors: (*Aircraft landings, Oscillation), Approach, Handling, Stability, Drag, Angle of attack, Airspeed, Elevators, Deflection, Flight simulators, Flight control systems, Sideslip, Flight paths, Response, Pitch (Motion), Gusts.

Identifiers: T33 aircraft.

The report is the second in a series of two reports dealing with longitudinal handling qualities in the landing approach. The T-33 variable stability and variable drag airplane was used in a flight program to evaluate various short period dynamics, phugoid dynamics, drag characteristics and elevator control authority levels. The first phase of the flight program was directed mainly at longitudinal short period dynamics, drag variation with angle of attack and elevator control authority. This work was reported in FDL TDR 64-60 (AD-608 620). The second phase of the flight program was directed at phugoid dynamics, short period frequency, elevator control authority and drag characteristics. Drag variations with angle of attack, airspeed and elevator deflection were considered. Pilot ratings and comments are related to the airplane characteristics tests. (Author)

AD-639 779 **Field 1B, 5I**
CFSTI Prices: HC$1.00 MF$0.50
Civil Aeromedical Research Inst., Oklahoma City, Okla.
THE PREDOMINANT CAUSES OF CRASHES AND RECOMMENDED THERAPY,
by Stanley R. Mohler. Apr 66, 5p
AM-66-8

Descriptors: (*Aviation accidents, Control), Pilots, Training, Physical fitness, Stress (Psychology), Stress (Physiology), Civil aviation, Aviation safety.

Close scrutiny of the causes of recent general-aviation fatal crashes reveals that there is a wide discrepancy between the accident rate and the actual risk of flying. A large percentage of accidents occur through horseplay, foolishness, and lack of respect for nature. An increased awareness of the state of one's body while flying, enhanced training, and attitude inculcation can do much to lower the accident rate. Pilots should be instructed to avoid flight while suffering from emotional distress or the effects of alcohol consumption or during deteriorating weather conditions. (Author)

AD-640 142 **Field 1B**
CFSTI Prices: HC$5.00 MF$1.00
Technology Inc., Dayton, Ohio.
CH-47A CHINOOK FLIGHT LOADS INVESTIGATION PROGRAM,
by Joseph F. Braun, and F. Joseph Giessler. Jul 66, 188p
Contract DA-44-177-AMC-221 (T)
Task 1P125901A14229
USAAVLABS-TR-66-68

Descriptors: (*Helicopters, Aerodynamic loading), Flight testing, Take-off, Descent, Landings, Maneuverability.

Identifiers: H-47 aircraft.

The report covers the collection and presentation of 165 hours of usable flight data for the CH-47A helicopter. The data recording system and the data processing procedure are described., and an analysis summary of the results of the flight data is presented. The flight data were recorded between 9 September 1964 and 2 December 1965. The area of operation was primarily at or adjacent to Fort Benning, Georgia. To analyze parameters according to distinct flight phases, the reduced data were separated into four mission segments: (1) takeoff and ascent; (2)maneuver; (3) descent, flare, and landing; anding; and (4) steady state. In the form of tables, histograms, and exceedance curves, the data indicate the time flown in the mission segments and parameter ranges and the number of parameter peaks occurring in the missions and ranges of other parameters. Exceedance curves are given for both the maneuver and the gust normal load factors. (Author)

AD-640 240 **Field 1B, 14A, 5A**
CFSTI Prices: HC$2.00 MF$0.50
Flight Safety Foundation, Inc., New York.
DEVELOPMENT OF A TECHNIQUE FOR ESTIMATING THE COST OF GENERAL AVIATION ACCIDENTS.
Final rept.,
by Jerome Lederer, Vernon A. Taylor, and Robert E. Glubiak. Jul 66, 46p
Contract FA-65-WA-1282
Proj. 142-421-08A
SRDS-RD-66-18

Descriptors: (*Costs, *Aviation accidents), Statistical analysis, Management planning, Aviation safety, Operations research.

The study of the cost of general aviation accidents is designed to provide the Federal Aviation Agency with a technique to estimate the annual dollar losses resulting from operational accidents in general aviation. The results should be useful in assisting management to arrive at the decisions involving accident prevention programs. The losses are separated by structural damage to aircraft; by medical costs resulting from injuries to aircraft occupants or to third parties; and by damage to property. The economic losses caused by fatal injuries are also estimated. (Author)

N66-28898 **Field 1B, 6P**
CFSTI Prices HC$2.00 MF$0.50
Flying Personnel Research Committee, London (England).
THE HUMAN FACTOR IN AIRCRAFT ACCIDENTS - INVESTIGATION OF BACKGROUND FACTORS OF PILOT ERROR ACCIDENTS.
by A. B. Goorney. May 65, 37p FPRC/MEMO-224

Descriptors: *Aircraft accident investigation, *Physiological factor, *Pilot error, *Psychological factor, Accident, Aircraft, Environment, Error, Experience, Factor, Fatigue (biol), History, Investigation, Medical, Physiology, Pilot, Psychology, Stress.

For abstract, see S 04 16.

N66-29483 **Field 1B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
PROBLEMS OF APPROACH DURING POOR VISIBILITY.
Problemes De L'approche Par Mauvaise Visibilite
by M. J. Gremillet. Feb 63, 9p NASA-TT-F-8369
Transl. Into English Of A French Paper Presented At The Agard Avionics Panel Meeting, Istanbul, 3-8 Oct. 1960

Descriptors: *Aircraft landing, *Approach and landing instrument, *Instrument landing system, *Landing aid, Aid, Aircraft, All-weather, Approach, Blind, Instrument, Landing, Low visibility, System.

For abstract, see S 04 16.

N66-35658 **Field 1B**
CFSTI Prices HC$2.50 MF$0.50
Systems Technology, Inc., Hawthorne, Calif.
APPLICATION OF APPROACH SPEED CRITERIA DERIVED FROM CLOSED-LOOP PILOT-VEHICLE SYSTEMS ANALYSES TO AN OGEE WING AIRCRAFT.
by R. J. Wasicko. Sep 66, 55p NASA-CR-579
Contract NAS2-1868

Descriptors: *Approach and landing, *Closed loop system, *F- 5 aircraft, *Man-machine system, *Ogee wing, *Piloted aircraft, Aircraft, Approach, Carrier, Closed, Drag, Field, Landing, Loop, Man-machine, Ogee, Pilot, Speed, Stability, System, Wing.

For abstract, see S 04 21.

PB-172 974 **Field 1B, 6F**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Sport Fisheries and Wildlife, Washington, D. C.
BIOLOGICAL CONTROL OF BIRDS IN AIRPORT ENVIRONMENTS.
Interim rept. 29 Jul 64-30 Jun 65,
by John L. Seubert. Jan 66, 49p
Contract FA-65-WA1-77
Proj. FA-430-011-01E
SRDS-RD-66-8

Descriptors: (*Birds, Pest control), (*Airports, Hazards), Aviation accidents, Aviation safety, Take-off, Landings, Reproduction (Physiology).

Since 1961 four aircraft crashes resulted from bird collisions. Commercial carriers reported 413 bird-plane strikes in 1964. Most strikes occurred during takeoffs and landings, and involved engines, wings, or windshields. Gulls and waterfowl were the main hazards. Bird strikes were associated with 162 U. S. and 39 foreign airports since 1961. Herring gulls, greater scaup and shore birds were the chief bird hazards observed at Kennedy Airport. Little has been done at Logan Airport to eliminate adjacent gull food sources and airport ponds, or to alter tidal flats. About 17,000 photographs of Weather Bureau WSR-57 radarscopes were taken in a study of waterfowl hazards to aircraft in the Mississippi Flyway. Egg breaking and spraying eggs with an oil-formaldehyde-water mixture were about equally effective in reducing herring gull production. Gull populations that are denied food move many miles to new sources. Studies of gull population dynamics indicate that error inherent in banding data renders them meaningless for measuring survival. Productivity and population data indicate a doubling of the herring gull population in New England every 15 years. A starling problem was solved at Hanscom Air Force Base, Massachusetts, by using an experimental contact avicide. Improved instrumentation permitted more exacting analyses of similarities and differences be-

tween sounds of Electra engines and singing insects. Starlings did not appear attracted to a variety of amplified sounds, including those of insects and Electra engines. (Author)

AD-468 936 See Field 17G

AD-640 136 See Field 12B

AD-640 375 See Field 4B

PB-173 125 See Field 4B

1C. AIRCRAFT

AD-639 693 **Field 1C, 12B, 1D**
CFSTI Prices: HC$3.00 MF$0.75
Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DIFFERENCE EQUATIONS - ADAPTIVE CONTROLLER DESIGN TECHNIQUE.
Master's thesis,
by Theodore T. Stein, Jr. Jun 66, 91p GGC/EE/66-18

Descriptors: (*Adaptive control systems, Design), (*Difference equations, Approximation (Mathematics)), Identification, Pattern recognition, Simulation, Dynamics.

Identifiers: Theses, X-15 aircraft.

An 'identification' means for adaptive control systems is an average difference equation approximation for the vehicle transfer function. Solution of the difference equation, accomplished in the control computer of the adaptive system, determines which of several fixed compensators to use for existing flight conditions. The difference equation derived for the X-15 longitudinal dynamics is analyzed mathematically for various inputs. The X-15 pitch-rate loop and control computer is simulated on analog and digital computers. The difference equation solution error becomes large after two or three seconds. Exact difference equations for given flight conditions are generally more accurate. Significant errors still result after several seconds. Computer results indicated the difference equation solution was relatively accurate for not more than two or three seconds. (Author)

AD-639 697 **Field 1C, 1D**
CFSTI Prices: HC$4.00 MF$0.75
Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
COMPARISON OF DIGITAL AND ANALOG MECHANIZATIONS OF A TRIPLE-REDUNDANT, SELF-ADAPTIVE FLIGHT CONTROL SYSTEM.
Master's thesis,
by Kenneth Elmer Schultz. Jun 66, 105p GGC/EE/66-17

Descriptors: (*Adaptive control systems, Model tests), Digital differential analyzers, Redundant components, Statistical analysis, Flight control systems.

Identifiers: Theses.

As a result of research performed for the Air Force, two laboratory models of a single-axis, triple-redundant, self-adaptive flight control system were constructed. Both models demonstrate extensive use of integrated circuits; but one system employs analog circuitry, while the other is essentially a digital-differential-analyzer. An objective system comparison is achieved with an exponentially weighted figure of merit incorporating numerical measures of system effectiveness with respect to seven comparison criteria: complexity, cost, performance, power, reliability, volume, and weight. The unique TRISAFE analog redundancy method is the primary reason for the overall superiority of the analog system. (Author)

AD-640 012 **Field 1C**
CFSTI Prices: HC$1.00 MF$0.50
Technical Information and Library Services, Ministry of Aviation, London (England).
NON-DETERIORATION OF H.R.C. FUSE-LINKS ON AIRCRAFT,
by G. W. Hunton. Jun 66, 15p S/T-Memo-5/66

Descriptors: (*Fuses (Electrical), Aircraft equipment), Malfunctions, Electrical equipment, Great Britain, Degradation, Joints.

Examination over a five-year period of H.R.C. fuse-links alleged to be defective in service revealed no signs of deterioration or 'ageing' of component parts. Examination of a large number of H.R.C. fuse links in service for over 10 years, some from Valiant aircraft with between 2,100 and 2,600 flying hours, and some from a Brittania aircraft with over 14,500 flying hours, showed that the fuse-links had not deteriorated and their performance characteristics had not altered. (Author)

AD-640 021 **Field 1C**
CFSTI Prices: HC$9.60 MF$0.75
General Electric Co., Cincinnati, Ohio. Flight Propulsion Lab. Dept.
AIRPLANE DETAIL SPECIFICATION.
17 Aug 62, 99p
Contract DA-44-177-TC-715
VZ-11 Lift Fan Flight Research Aircraft Program.

Descriptors: (*Vertical take-off planes, Specifications), (*Research planes, Specifications), Design.

Identifiers: V-5 aircraft.

AD-640 135 **Field 1C**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Development Center, Johnsville, Pa. Aero-Electronic Technology Dept.
INVESTIGATION OF THE MANUAL OVERRIDE TRIM SWITCH USED IN THE AD TYPE AIRCRAFT.
Final rept.,
by J. P. Triolo. 29 Aug 66, 10p NADC-AE-6629

Descriptors: (*Control systems, Malfunctions), (*Trim tabs, Control systems), Attack bombers, Actuators, Failure (Mechanics).

Identifiers: A-1 Aircraft.

The NAVAIRDEVCEN laboratory investigation indicated that the run-away trim condition reported in the AD type aircraft could be attributed to malfunctioning of the manual override trim switch. Failure of the switch was caused by a deficiency of the material used for the internal construction of the control solenoids. (Author)

AD-640 305 **Field 1C, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
METHOD OF TESTING ACTUAL SPECIMENS AND PANELS OF AIRPLANE SKIN FOR RESISTANCE TO VIBRATION,
by M. F. Astakhov, and B. N. Yevdokimov. 18 Apr 66, 8p FTD-TT-65-1742
Unedited rough draft trans. of Patent (USSR) 164 453, appl. 849751/40-23, 27 Jul 63.

Descriptors: (*Airplane panels, Vibration), (*Airframes, Test methods), USSR, Patents, Test equipment, Propellers (Aerial), Stresses, Strain gages.

The object of the invention is a method of testing actual specimens and panels of airplane skin for vibration resistance in a shell with a propeller-engine unit. The tested parts and the panels of the airplane skin are arranged in rows in ring fashion on frames, fastened on the walls of the channel of a shell at a given distance from the ends of the blades and are subjected to the action of vibration from the propeller. The vibration stress is measured by strain gages fastened on elements of the skin and connected by screened wire with the measuring equipment.

AD-640 338 **Field 1C**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Cincinnati, Ohio. Advanced Engine and Technology Dept.
FUSELAGE STRUCTURAL ANALYSIS. VOLUME IV. ENGINE INLET, THRUST SPOILER, PITCH FAN LOUVERS.
Mar 65, 44p Rept. no. 144
Contract DA-44-177-TC-715
Rept. on XV-5A Lift Fan Flight Research Aircraft Program.

Descriptors: (*Vertical take-off planes, Fuselages), (*Research planes, Fuselages), (*Fuselages, Structural properties), Aircraft engine ducts, Spoilers, Ducted fans, Thrust, Pitch (Motion), Analysis.

Identifiers: V-5 aircraft.

The structural analyses of the engine air inlet, the thrust spoiler installation, and the pitch fan louver installation of the U. S. Army XV-5A Lift Fan Research Aircraft are presented.

AD-640 340 **Field 1C**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Cincinnati, Ohio. Advanced Engine and Technology Dept.
STRUCTURAL PROOF TEST PROGRAM.
1966, 77p Rept. no. 126
Contract DA-44-177-TC-715
Rept. on XV-5A Lift Fan Research Aircraft Program.

Descriptors: (*Vertical take-off planes, Structural properties), (*Research planes, Structural properties), Tests, Loading (Mechanics).

Identifiers: V-5 aircraft.

The test program is designed to demonstrate integrity of aircraft structure and the information presented will be used to establish detail test procedures. The particular flight and landing load conditions to be simulated during test have been derived from structural analysis using the conditions specified in the Airplane Structural Design Criteria and have been found critical. A detailed listing of all test data requirements is given. The particular loads and reactions to be applied to the airframe and the major components are also given. Along with the strength tests, some additional control system tests are to be performed and are also described. (Author)

N66-27188 **Field 1C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
LANDING GEAR FOR NOSE-WHEEL EQUIPPED PLANES.
Velivolo Con Carello Di Ruota Di Prua
Nov 63, 7p NASA-TT-F-8579
Transl. Into English From Italian Patent No. 409389, 11 Feb. 1945

Descriptors: *Landing gear, *Lateral stability and control, *Nose gear, *Takeoff and landing, Aircraft, Control, Displacement, Gear, Landing, Lateral, Nose, Stability, Takeoff, Taxiing, Wheel.

For abstract, see S 04 15.

N66-27220 **Field 1C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
SOME PARAMETERS AFFECTING THE PERFORMANCE OF PNEUMATIC TIRES ON WET PAVEMENT.
by T. J. Leland. 1965, 29p NASA-TM-X-56880
Presented At Stapp Car Crash Conf., Minneapolis, 20-22 Oct. 1965

Descriptors: *Directional control, *Runway condition, *Tire, Aircraft, Application, Braking, Condition, Control, Design, Direction, Friction, Pavement, Pneumatic, Roughness, Runway, Traction, Wetness.

For abstract, see S 04 15.

N66-27729 **Field 1C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
JET-INDUCED LIFT LOSS OF RET VTOL CONFIGURATIONS IN HOVERING CONDITION.
by H. C. Mc lemore. Jun 66, 35p NASA-TN-D-3435

Descriptors: *Hovering, *Jet lift, *Vtol aircraft, Aircraft, Configuration, Engine, Flight, Jet, Lift, Loss, Nozzle, Thrust, Turbojet, Velocity, Vtol.

For abstract, see S 04 15.

N66-27730 **Field 1C**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
INVESTIGATION OF A SEMISPAN TILT-WING VTOL MODEL TO DETERMINE GROUND EFFECT ON FULL-SPAN FLAPS USED FOR YAW CONTROL IN HOVERING.
by K. J. Grunwald. Jun 66, 75p NASA-TN-D-3437

Descriptors: *Ground effect, *Hovering, *Semispan model, *Tilt-wing aircraft, *Vtol aircraft, Aircraft, Control, Effect, Flap, Flight, Force, Ground, Model, Semispan, Test, Tilt, Vtol, Wing, Yaw.

For abstract, see S 04 15.

N66-27928 **Field 1C**
CFSTI Prices HC$6.00 MF$1.25
Space Corp., Dallas, Tex.
PARACHUTE RECOVERY SYSTEM FOR A RECORDER CAPSULE FINAL REPORT NO. 8, JAN. 14 FEB. 7, 1966.
7 Feb 66, 234p NASA-CR-75647
Contract NAS8-11819

Descriptors: *Drop test, *Parachute, *Recovery device, Capsule, Configuration, Deployment, Device, Dissipation, Drop, Dummy, Force, Impact, Modification, Recovery, Test.

For abstract, see S 04 15.

N66-28013 **Field 1C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Flight Research Center, Edwards, Calif.
SUMMARY OF PRELIMINARY DATA DERIVED FROM THE XB-70 AIRPLANES.
by W. H. Andrews. Jun 66, 41p NASA-TM-X-1240

Descriptors: *Flight test, *Performance characteristics, *Supersonic transport, Boom, Characteristics, Control, Data, Flight, Inlet, Landing, Noise, Performance, Propulsion, Response, Sonic, Stability, Supersonic, Takeoff, Test, Thermal, Transport.

For abstract, see S 04 15.

N66-28034 **Field 1C**
CFSTI Prices HC$3.00 MF$0.75
Schjeldahl (G. T.) Co., Northfield, Minn.
DEVELOPMENT AND TESTING OF THE DISK-GAP-BAND PARACHUTE USED FOR LOW DYNAMIC PRESSURE APPLICATIONS AT EJECTION ALTITUDES AT OR ABOVE 200,000 FEET.
by C. V. Eckstrom. Jun 66, 64p NASA-CR-502
Contract NAS1-3372

Descriptors: *Flight test, *High altitude, *Inflatable structure, *Parachute, *Sounding rocket, Deployment, Ejection, Flight, Inflatable, Rocket, Sounding, Stability, Structure, Test.

For abstract, see S 04 15.

N66-28276 **Field 1C, 20K**
CFSTI Prices HC$2.00 MF$0.50
National Aero- And Astronautical Research Inst., Amsterdam (Netherlands).
STRAIN MEASUREMENTS ON EIGHT FULL-SCALE WING CENTER SECTIONS SCIENTIFIC REPORT NO. 3.
by A. Nederveen, J. Schijve, and P. J. Sevenhuysen. 20 Dec 63, 49p NLR-SR-S.610, AD-631349
Contract AF 61/052/-439

Descriptors: *Fatigue test, *Load test, *Strain, *Wing, Bending, Center, Distribution, Failure, Fatigue, Load, Loading, Mechanics, Random, Section, Static, Stress, Test.

For abstract, see S 04 15.

N66-28880 **Field 1C**
CFSTI Prices HC$2.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
THE TECHNIQUE OF TOWING PARACHUTES BEHIND METEOR VT 150 WITH INSTRUMENTATION.
by G. G. Gale, and K. James. May 60, 44p RAE-TN-ME-317

Descriptors: *Meteor aircraft, *Parachute, Container, Great britain, Instrumentation, Procedure, Safety, Stream, Thrust, Tow, Velocity.

For abstract, see S 04 16.

N66-29468 **Field 1C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Flight Research Center, Edwards, Calif.
PRELIMINARY RESULTS OF AERODYNAMIC HEATING STUDIES ON THE X-15 AIRPLANE.
by R. D. Banner, A. E. Kuhl, and R. D. Quinn. Mar 62, 22p NASA-TM-X-638

Descriptors: *Aerodynamic heating, *Flight test, *Heat-transfer coefficient, *X-15 aircraft, Aerodynamic, Boundary, Coefficient, Flight, Fluid, Heat transfer, Heating, Hypersonic, Layer, Mechanics, Pressure, Skin, Supersonic, Surface, Temperature, Test, Thermocouple, Transition, Turbulent.

For abstract, see S 04 16.

N66-29728 **Field 1C**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration, Washington, D. C.
FLIGHT HANDLING QUALITY PROBLEMS POSED BY SWEPT-WING TRANSPORT PLANES WITHOUT TAIL UNITS.
Quelques Problemes De Qualities De Vol Poses Par Les Avions De Transport A Aile Elancee Sans Empennage
by E. Fage, and P. Lecomte. Jun 66, 69p NASA-TT-F-10204
Transl. Into English Of A French Paper Presented At The 28th Meeting Of The Flight Mech. Group Of Agard

Descriptors: *Aircraft performance, *Handling quality, *Swept wing, *Tailless aircraft, *Transport aircraft, Aerodynamic, Aircraft, Characteristics, Handling, Performance, Quality, Sweep, Sweepback, Tailless, Wing.

For abstract, see S 04 16.

N66-36098 **Field 1C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
DESIGN METHODS FOR MINIMIZATION OF SONIC-BOOM PRESSURE-FIELD DISTURBANCES.
by F. E. Mc lean, and B. L. Shrout. 1965, 23p NASA-TM-X-57028
Presented At The 70th Meeting Of The Acoust. Soc. Of Am., St. Louis, 3-6 Nov. 1965

Descriptors: *Aircraft configuration, *Pressure field, *Sonic boom, Aircraft, Altitude, Attenuation, Boom, Configuration, Design, Disturbance, Field, Method, Minimization, Near, Overpressure, Pressure, Sonic.

For abstract, see S 04 21.

N66-36120 **Field 1C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
SONIC-BOOM CHARACTERISTICS OF PROPOSED SUPERSONIC AND HYPERSONIC AIRPLANES.
by H. W. Carlson, L. W. Hunton, and F. E. Mc lean. Sep 66, 17p NASA-TN-D-3587
Contract 126-13-03-22-23
Presented At The Conf. On Aircraft Aerodyn., Langley Sta., Va., 23-25 May 1966

Descriptors: *Hypersonic aircraft, *Sonic boom, *Supersonic aircraft, Aircraft, Boom, Climb, Conference, Cruise, Hypersonic, Impulse, Overpressure, Sonic, Supersonic.

For abstract, see S 04 21.

N66-36247 **Field 1C**
CFSTI Prices HC$3.00 MF$0.50
United Aircraft Corp., Norwalk, Conn. Norden Div.
A STUDY OF DISPLAY INTEGRATION FOR HYPERSONIC RESEARCH VEHICLES FIRST QUARTERLY PROGRESS REPORT, 16 MAY - 16 AUG. 1963.
by C. F. Schaefer, and P. R. Williams. 13 Sep 63, 53p NASA-CR-77937
Contract NASW-675
Its Rept.- 1141-r-0003a

Descriptors: *Display system, *Flight control, *Television transmission, *X- 15 aircraft, Aircraft, Analog, Contact, Control, Display, Flight, Hypersonic, Information, Pilot, Television.

For abstract, see S 04 21.

AD-478 914 **See Field 20D**

AD-639 702 **See Field 12B**

AD-640 015 **See Field 13J**

AD-640 339 **See Field 1A**

AD-640 436 **See Field 11C**

1D. AIRCRAFT FLIGHT CONTROL AND INSTRUMENTATION

AD-452 792 **Field 1D**
CFSTI Price: HC$4.00
Kellett Aircraft Corp., Philadelphia, Pa.
EFFECTS OF AIRFRAME GEOMETRY ON DOWNWASH PROBLEMS OF TANDEM DUCTED-PROPELLER VTOL AIRCRAFT
Rept. for Jul 61-May 63,
by Richard R. Pruyn. Jan 64, 127p Rept. no. 179T80-6
Contract NOw-61-0926
See also AD-427 843, AD-427 844, N65-15758.

Descriptors: (*Vertical take-off planes, Ducted fans), (*Ducted fans, Downwash), Model tests, Ground effect, Performance (Engineering), Aerodynamic characteristics, Interference, Ducts, Deflection, Fluid Dynamic properties, Aerodynamic configurations, Duct inlets.

Identifiers: Tandem propellers.

A full scale half-model simulation of a dual tandem ducted propeller VTOL aircraft has been tested at heights of less than two duct diameters above sand and water terrain. Data on terrain transport, terrain caused aircraft damage, flow field measurements and ducted propeller performance were obtained. These tests were conducted at propeller disc loadings up to 60 pounds per square foot with various aircraft configurations and ducted propeller orientations. The dual tandem configuration was found to cause a significant increase in downwash problems compared to isolated propeller configurations previously tested. Reduced performance, severe engine and propeller damage and an oscillating aerodynamic interference were experienced. Several promising devices to alleviate downwash problems were evaluated. (Author)

AD-468 857 **Field 1D**
CFSTI Prices: HC$3.00 MF$0.75
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
GROUND SIMULATOR EVALUATIONS OF COUPLED ROLL-SPIRAL MODE EFFECTS ON AIRCRAFT HANDLING QUALITIES.
by Fred D. Newell. Mar 65, 58p Technical rept. CAL-TC-1921-F-1
Contract AF 33 (615)-1253
Proj. AF-8219
Task 821905
AFFDL-TR-65-39

Descriptors: (*Fighters, Aerodynamic characteristics), (*Flight, Fighters), Flight simulators, Handling, Control, Angle of attack, Roll, Oscillation, Damping, Equations, Ailerons, Aerial rudders, Stability, Pilots.

A systematic investigation of the lateral handling qualities of fighter aircraft on an en route IFR mission was made in a fixed-base ground simulator. The suitability of a wide range of roll and spiral mode root locations was examined with particular emphasis placed upon determining the effects of complex roll-spiral roots. The complex roll-spiral roots were produced with several feasible combinations of stability derivatives. Interaction effects of the Dutch roll mode roots were examined, including the effects of the proximity of these roots to the complex roll-spiral mode roots. Assessment of the flying qualities is reported in terms of the evaluation comments and ratings given by two pilots. In general the complex roll-spiral configurations that were evaluated were too difficult to control in roll to consider their handling quality characteristics as acceptable for fighter aircraft. (Author)

N66-28037 **Field 1D**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
FLIGHT INVESTIGATION OF AN ON-OFF CONTROL FOR V/STOL AIRCRAFT UNDER VISUAL CONDITIONS.
by D. J. Dicarlo, N. R. Driscoll, and J. F. Garren Jr. Jun 66, 26p NASA-TN-D-3436

Descriptors: *Aircraft control, *Attitude control, *Flight test, *Helicopter, *V/stol aircraft, Aircraft, Attitude, Control, Damping, Flight, Moment, Performance, Power, Stability, System, Test, Variation.

For abstract, see S 04 15.

N66-35954 **Field 1D**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
INSTABILITY CRITERIA IN THE STUDY OF MINIMIZING ROLLING AND PITCHING.
Critere D'instabilite Dans L'etude Du Couplage Roulis-tangage
by M. Mesniere. Aug 66, 12p NASA-TT-F-10247
Transl. Into English Of A Paper Presented At The Agard Congr. On Stability And Flight Controls, Cambridge, England, 20-23 Sep. 1966 P 1-9

Descriptors: *Aircraft stability, *Delta wing, *Nord 1500 aircraft, *Pitch control, *Roll control, Aircraft, Analog, Computer, Control, Coupling, Delta, Instability, Pitch, Rate, Roll, Stability, Sweep, Wing.

For abstract, see S 04 21.

AD-479 129 **See Field 17G**

AD-639 693 **See Field 1C**

AD-639 697 **See Field 1C**

1E. AIR FACILITIES

AD-639 644 **Field 1E, 5H**
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
THE USE OF DISPLACEMENT, FLASH, AND DEPTH-OF-FLASH CODED DISPLAYS FOR PROVIDING CONTROL SYSTEM INFORMATION,
by P. N. Ziegler, R. E. Reilly, and R. Chernikoff. 6 Jul 66, 10p NRL-6412
Proj. RR-006-09-41-5351

Descriptors: (*Landing aids, Display systems), (*Coding, Display systems), Visual signals, Control systems, Aircraft, Human engineering, Brightness, Glide path systems.

Two experiments were performed to investigate the use of brightness-coding and flash-coding techniques for presenting information usually provided by displacement displays. The first experiment compared a conventional displacement display with this same display incorporating flash coding, using one of two frequencies to indicate high or low error direction. The results of the study showed that at longer viewing ranges, at which the displacement cannot be discriminated, tracking performance was enhanced by the addition of flash coding to the displacement display. The second experiment, using a point source of light, compared flash coding (of error direction) with combined flash and brightness coding (of error direction plus magnitude). This latter display, termed 'depth of flash,' was found to be superior after a relatively short learning period. The findings indicate that the depth-of-flash technique may be a fruitful approach in the development of an effective landing aid. (Author)

AD-639 660 **Field 1E, 8L**
CFSTI Prices: HC$3.00 MF$0.75
Naval Civil Engineering Lab., Port Hueneme, Calif.
COMPACTED-SNOW RUNWAYS IN ANTARCTICA DEEP FREEZE 65 TRIALS.
Technical rept.,
by E. H. Moser Jr, and G. E. Sherwood. Sep 66, 81p TR-R-480
Proj. Y-F015-11-01-054

Descriptors: (*Runways, Snow), (*Snow, Trafficability), Antarctic regions, Soil mechanics, Construction, Maintenance, Transport planes.

Identifiers: Deep Freeze 65.

Snow-compaction investigations were conducted on the Ross Ice Shelf adjacent to McMurdo Sound during Deep Freeze 65 following investigations made during Deep Freeze 61 through Deep Freeze 64. A 150-by 6,000-foot runway was constructed by adding a 16-inch layer of compacted snow over an existing layer. Construction was completed on 24 November 1964 and the runway was maintained and repaired for aircraft tests until 14 February 1965. Snowplow carriers used in clearing the runway of drift snow greatly reduced the time required for this operation over previous methods using a snowplane. A 6 by 6 truck-tractor with high-flotation tires served as a prime mover for maintenance equipment, and resulted in large savings in time over use of a size 2 snow tractor. This wheeled vehicle also eliminated damage to the runway surface caused by track vehicles. The runway was tested early in the season by a 25,000-pound C-47J aircraft with tire inflation pressure of 60 psi; it was tested five times at approximately 2-week intervals by an LC-130F aircraft weighing from 90,000 to 135,000 pounds with tire inflation pressures of 85 to 95 psi. During the first LC-130F tests, intermittent failures occurred in the DF-65 layer of compacted snow due to misses between lanes of snow processed by the mixers and seams of unprocessed snow between the DF-64 and DF-65 layers. These low-strength areas were repaired by reprocessing with the mixers, which brought their strength up to that of the original DF-65 layer. It was concluded that well-processed snow will support a 125,000-pound LC-130F aircraft with tire inflation pressure of 85 psi during periods of air temperatures to 32 F and snow temperatures to 23 F. (Author)

AD-639 643 **See Field 17G**

AD-640 374 **See Field 13L**

PB-172 894 **See Field 17G**

2A. AGRICULTURAL CHEMISTRY

AD-640 016 **See Field 15B**

2D. AGRONOMY AND HORTICULTURE

AD-640 047 **See Field 6C**

PB-170 918 **See Field 6R**

2E. ANIMAL HUSBANDRY

AD-639 761 **See Field 6E**

2F. FORESTRY

AD-640 216 **See Field 4B**

PB-173 141 **See Field 11L**

3A. ASTRONOMY

AD-639 684 **Field 3A, 3C, 3B**
CFSTI Prices: HC$2.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
LUNAR DIMENSIONS: ANNOTATED BIBLIOGRAPHY.
5 Aug 66, 27p ATD-66-96
TT-66-62369
Compiled from Soviet open sources pub. 1964-1966 and one Chicom open source pub. in 1965. Rept. on Surveys of Foreign Scientific and Technical Literature.

Descriptors: (*Moon, Extraterrestrial topography), USSR, Abstracts, Bibliographies, Lunar trajectories, Astronomy, Astrophysics, Celestial mechanics.

An annotated bibliography compiled from Soviet open sources published 1964-1966 and one Chicom open source published in 1965. It is the se-

cond in a series and it reflects Soviet developments from about mid-1965 in investigating lunar revolution, rotation, libration, and mapping techniques. The entries are arranged alphabetically by author or by the first word in the title. There are 37 entries and an index of authors is provided at the end of the report. Pertinent information included: velocity profile of the Moon, libration effect based on meridian observations of lunar diameters in Greenwich in 1900-1954, determination of the equinox correction from lunar observations by Newcomb's method, methods for computing the ephemerides of the Moon, lunar polygonometry technique, determination of the constants of lunar libration, theory of physical libration of the Moon, diurnal rotation of planets, gravity and shape of the Moon, lunar measuring equipment. (Author)

AD-639 877 **Field 3A**
Not available from CFSTI.
Center for Radiophysics and Space Research, Cornell Univ., Ithaca, N. Y.
LUNAR OCCULTATION OF THE RADIO SOURCES 0938 + 18 AND 1101 + 11.
Revised ed.,
by M. H. Cohen, and M. R. Kundu. 10 Sep 65, 7p
Contract AF 49 (638)-1156
Proj. AF-2838
AFOSR-66-1590
Availability: Published in The Astrophysical Journal v143 n3 p621-5 Mar 1966.

Descriptors: (*Radio astronomy, *Moon), Position finding, Stellar eclipses.

Identifiers: Lunar occultation.

The radio sources 0938 + 18 and 1101 + 11 have been observed at 430 MHz during the immersion phase of a lunar occultation. The source 0938 + 18 is a single source of diameter 4 in.; 1101 + 11 is a double source with approximately equal components separated by 9 in.4. The Palomar Sky Survey prints show a faint blue object near 0938 + 18, and show no optical object at the position of 1101 + 11. (Author)

AD-639 973 **Field 3A, 20J**
Not available from CFSTI.
Institute of Theoretical Physics, Stanford Univ., Calif.
ANALYSIS OF THE PROPOSED PLANETARY RADAR REFLECTION EXPERIMENT,
by D. K. Ross, and L. I. Schiff. 24 Sep 65, 6p
Contract AF 49 (638)-1389
Proj. AF-9751
Task 975101
AFOSR-66-1325
Availability: Published in The Physical Review v141 n4 p1215-8 Jan 1966.

Descriptors: (*Radio astronomy, *Relativity theory), (*Radar reflections, Planets), Tests, Experimental data.

An analysis is made of an experiment recently proposed by Shapiro as a new test of general relativity theory. This consists in measuring the transit times of radar signals reflected from one of the inner planets. It is found that if the observations are expressed in terms of measurable orbital parameters, as they must be eventually, this experiment has the unexpected property of being sensitive to a nonlinear term in Einstein's theory. Great care must be taken in deciding what is actually measurable, and it is shown that the process of reconciling the results of calculations performed with mathematically different but physically equivalent forms of the metric is of considerable help in making this decision. (Author)

AD-640 392 **Field 3A**
CFSTI Prices: HC$1.00 MF$0.50
Center for Radiophysics and Space Research, Cornell Univ., Ithaca, N. Y.
SMOOTHING RADIO ASTRONOMICAL DATA.
Technical rept.,
by M. H. Cohen. Sep 66, 15p CRSR-251
Contract Nonr-401 (27)

Descriptors: (*Radio astronomy, Astronomical data), (*Astronomical data, Sampling), Radiometers, Radiofrequency filters, Statistical distributions.

Consideration is given to a radiometer output voltage which is put through an analogue filter and then sampled at uniform intervals. The resulting time series is filtered in various ways and then processed to get the desired information. Concern was mainly directed to the production of a power spectrum, with particular application to interplanetary scintillation data obtained at the Arecibo Ionospheric Observatory. The ideas are more general, however, and applications exist in many other areas. (Author)

N66-27221 **Field 3A**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
FIRST RESULTS OF A RADIOASTRONOMICAL OBSERVATION OF AN ANNULAR SOLAR ECLIPSE.
Pervyye Rezulitaty Radionablyudeniy Kol'tseobraznogo Zatmeniya Solntsa
by A. P. Molchanov, and K. N. Tavastsherna. 15 Aug 63, 6p NASA-TT-F-8620, ST-RA-10035
Contract NAS5-2078
Transl. Into English From Vestn. Akad. Nauk Ssr (Moscow), No. 3, Mar. 1963 P 98-100

Descriptors: *Astronomy, *Radiometry, *Solar eclipse, Atmosphere, Disk, Eclipse, Ellipticity, Emission, Expedition, Limb, Photosphere, Radio, Solar, Spectrum, Telescope, Wavelength.

For abstract, see S 04 15.

N66-29433 **Field 3A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
SPECTROPHOTOMETRIC STUDY OF THE INTENSIFICATION OF THE 5577 ANGSTROM LINE IN ZODIACAL LIGHT.
Spektrofotometricheskoye I ssleddvaniye Usileniya Linii 5577 Angstrom V Zodiakal'nom Svete
by Z. V. Karyagina. Nov 63, 16p NASA-TT-F-8702
Transl. Into English From Izv. Astrofiz. Inst. Akad. Nauk Kaz. Ssr, V. 5, No. 7, 1957 P 110-119

Descriptors: *Airglow, *Night sky, *Spectrophotometer, *Zodiacal light, Angle, Brightness, Emission, Integral, Intensification, Interference, Light, Line, Night, Sky, Zodiac.

For abstract, see S 04 16.

N66-29738 **Field 3A**
CFSTI Prices HC$3.00 MF$0.50
Lincoln Lab., Mass. Inst. Of Tech., Lexington.
RADAR STUDIES OF THE MOON QUARTERLY PROGRESS REPORT NO. 2, 1 FEB. - 30 APR. 1966.
2 Jun 66, 57p NASA-CR-76012
Contract NSR-22-009-106

Descriptors: *Haystack project, *Lunar surface, *Radar observation, *Radio wave, *Scattering, Backscatter, Computer, Depth, Lunar, Mapping, Measurement, Moon, Observation, Polarization, Program, Radar, Radio, Shadow, Surface, Wave.

For abstract, see S 04 16.

N66-29979 **Field 3A**
CFSTI Prices HC$5.00 MF$1.00
Michigan Univ., Ann Arbor. Dept. Of Astronomy.
ORBITING CORONAGRAPH FINAL REPORT.
by O. C. Mohler, and R. G. Teske. May 66, 168p NASA-CR-76089
Contract NASR-54/09/
Its Rept.-07270-1-f

Descriptors: *Chromosphere, *Coronagraph, *Guidance and control, *Optical equipment, *Telescope, Control, Design, Equipment, Feasibility, Guidance, High angle, Optical, Orbit, Solar, Structure, Sun.

For abstract, see S 04 16.

N66-35699 **Field 3A**
CFSTI Prices HC$2.00 MF$0.50
Royal Observatory, Edinburgh (Scotland).
REPORT OF THE ASTRONOMER ROYAL FOR SCOTLAND FOR THE YEAR ENDING 31ST MARCH 1966.
by H. A. Brueck. 31 Mar 66, 24p

Descriptors: *Astrophysics, *Photometry, *Satellite photography, *Seismology, Array, Astronomy, Composition, Instrumentation, Photography, Rocket, Rotation, Satellite, Stellar.

For abstract, see S 04 21.

N66-35795 **Field 3A**
CFSTI Prices HC$2.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
NEW SYSTEM OF ELEMENTS AND TABLES OF MOTION OF JUPITER'S X SATELLITE.
Novaya Sistema Elementov I Tablitsy Dvizheniya X Sputnika Yupitera
by E. N. Lemekhova. 5 May 66, 43p NASA-CR-77675, ST-SPHA-CM-10483
Contract NAS5-9299
Transl. Into English From Byul. Inst. Teor. Astron. (Ussr), V. 8, No. 2/95/, 1961 P 103-133

Descriptors: *Jupiter (planet), *Natural satellite, *Satellite orbit, Coordinate, Element, Moon, Motion, Natural, Observation, Orbit, Perturbation, Satellite, System, Table.

For abstract, see S 04 21.

N66-36072 **Field 3A**
CFSTI Prices HC$1.00 MF$0.50
Northwestern Univ., Evanston, Ill. Dear Born Observatory.
ELECTRO-OPTICAL SENSORS RESEARCH STUDY AND ASTRONOMICAL OBSERVATIONS SEMIANNUAL PROGRESS REPORT, 15 JUN. - 15 DEC. 1965.
by J. Burns, and J. A. Hynek. 1965, 11p NASA-CR-77863
Contract NGR-14-007-033

Descriptors: *Image orthicon tube, *Magnetic field, *Star cluster, *Variable star, Astronomy, Cluster, Field, Focus, Image, Magnetic, Observation, Orthicon, Performance, Period, Short, Stability, Star, Strong, Tube, Variable.

For abstract, see S 04 21.

N66-36074 **Field 3A**
CFSTI Prices HC$3.00 MF$0.50
Florida State Univ., Tallahassee. Dept. Of Physics.
A STUDY OF MILLISECOND PULSES CONTAINED IN THE DECAMETRIC RADIO RADIATION FROM JUPITER.
by R. T. Lee. Aug 66, 56p NASA-CR-77860
Grant NSG-224-61

Descriptors: *Jupiter (planet), *Radio emission, Bandwidth, Decametric, Emission, Noise, Planet, Polarization, Pulse, Radiation, Radio, Resolution, Time.

For abstract, see S 04 21.

N66-36080 **Field 3A**
CFSTI Prices HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C. E. O. Hulburt Center For Space Research.

RECENT EXTREME ULTRAVIOLET SOLAR SPECTRA AND SPECTROHELIGRAMS.
by W. E. Austin, J. D. Purcell, C. B. Snider, R. Tousey, and K. G. Widing. 1966, 20p NASA-CR-77752
NASA ORDER R-104
Presented At The Cospar Meeting, Vienna, 10-19 May 1966 Submitted For Publication

Descriptors: *Solar spectrum, *Spectroheliograph, *Ultraviolet spectrum, Extreme, Flight, Line, Photograph, Radiation, Rocket, Solar, Spectrum, Ultraviolet.

For abstract, see S 04 21.

N66-36082 **Field 3A**
CFSTI Prices HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C. E. O. Hulbert Center For Space Research.
USE OF THE MOON TO DISTINGUISH THE F FROM THE K CORONA USING A ROCKET CORONAGRAPH DURING AN ECLIPSE.
by M. J. Koomen, R. E. Mc cullough, R. T. Seal Jr, and R. Tousey. 1965, 23p NASA-CR-77754
NASA ORDER R-107
Presented At The Nasa Eclipse Symp., Ames Res. Center, Moffett Field, Calif., 17 Dec. 1965 Submitted For Publication

Descriptors: *Coronagraph, *K corona, *Solar eclipse, Eclipse, Experiment, Instrumentation, Moon, Observation, Orbit, Rocket, Solar, Vehicle.

For abstract, see S 04 21.

N66-36263 **Field 3A**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
FREQUENCY SPECTRA OF THE SOURCES 3 C 295 AND 3 C 380.
Chastotnyye Spektry Istochnikov 3c 295 I 3c 380
by L. L. Bazelyan, S. YA.Braude, and A. V. Men. 14 Apr 66, 8p NASA-CR-77886, ST-IGA-10476
Contract NAS5-9299
Transl. Into English From Astron. Tsirkuliar Akad. Nauk Sssr (Kazan), No. 357, 25 Feb. 1966 P 5-7 Presented At The All-union Conf. On Radioastronomy, Kharkov, 1965

Descriptors: *Flux density, *Interferometer system, *Stellar luminosity, Astronomy, Density, Flux, Frequency, Interferometer, Light, Luminosity, Measurement, Radiophysics, Source, Stellar, System, Wideband.

For abstract, see S 04 21.

AD-639 733 **See Field 20J**

AD-639 880 **See Field 20J**

AD-639 893 **See Field 8G**

AD-640 327 **See Field 22A**

PB-170 960 **See Field 14B**

3B. ASTROPHYSICS

AD-639 737 **Field 3B**
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
ON THE THEORETICAL TRANSITION PROBABILITIES OF CERTAIN EMISSION LINES OF THE SOLAR CORONA.
Revised ed.,
by T. K. Krueger, and S. J. Czyzak. 22 Dec 65, 12p ARL-66-0172
Proj. AF-7114
Revision of manuscript submitted 20 Sep 65.
Availability: Published in The Astrophysical Journal v144 n3 p1194-1202 Jun 1966.

Descriptors: (*Solar corona, *Electron transitions), Probability, Wave functions, Line spectrum.

Theoretical transition probabilities are presented for forbidden lines of ions recently found in the solar corona and also for unobserved lines of these ions. The observed energy levels were analyzed in intermediate coupling, where possible, to get the quantities necessary to compute the transition probabilities; any quantities not obtainable in this manner were found by extrapolation using observed lines or were calclated from Hartree-Fock wave functions. The most important of these calculated atomic parameters are included. (Author)

AD-639 747 **Field 3B**
CFSTI Prices: HC$2.00 MF$0.50
Kapteyn Astronomical Lab., Groningen (Netherlands).
R. S. OPHIUCHI: REDUCTION OF SPECTRA FROM THE 1958 OUTBURST.
Final rept.,
by C. R. Tolbert, J. C. Pecker, and S. R. Pottasch. 1965, 39p
Contract N62558-4121
Proj. NR-046-777

Descriptors: (*Stars, Line spectrum), Hydrogen, Absorption spectrum, Reduction, Novae, Sweden.

Spectra taken at the 1958 outburst of R. S. Ophiuchi have been reduced to units of ergs /sq cm/sec/A and are presented as a function of time for the first month and a half after maximum. The Balmer decrement was constant during the first 3 weeks and agreed well with that found at the 1933 event. The hydrogen lines appeared cut-off on the violet in the early days and an absorption line with velocity around 4000 km/sec was indicated. Many narrow (< or = 1A) absorption and emission lines were noted, mostly from < and > Fe. <OIII>, <NII>, and <NeIII> were seen after about the 5th day. Intensities and half-widths are given for all the lines measured. (Author)

AD-639 789 **Field 3B, 20H**
Not available from CFSTI.
National Research Council of Canada, Ottawa (Ontario).
THE VARIATION OF THE COSMIC RAY INTENSITY DURING THE ELEVEN-YEAR SOLAR CYCLE,
by D. C. Rose, and J. Katzman. 1965, 5p
Availability: Published in Proc. Int. Conf. Cosmic Rays p186-9 1965.

Descriptors: (*Cosmic rays, Intensity), Solar disturbances, Nucleons, Mesons, Canada.

The intensity changes of both the nucleaon and meson components of cosmic rays have been measured at Ottawa, geomagnetic latitude 56.8 degrees N, since 1954 at Churchill, geomagnetic latitude 68.7 degrees N, and at Resolute, geomagnetic latitude 82.9 degrees N, since 1957. The difference in intensity at Ottawa between solar minimum in 1954 and maximum in 1958 is 25% of the value at solar minimum in the case of the nucleon component and 5% in the case of the meson component. All three stations are north of the latitude effect knee where the geomagnetic rigidity cut-off is will below the cut-off due to the atmospheric absorption. Yet the increase in intensity during decrease in solar activity from 1958 until the end of 1964 is not the same at the three stations. The differences cannot be attributed to any latitude effect and the two components do not behave in the same way. Some form of asymmetry in the dissipation of the modulating mechanism is suggested but no completely acceptable explanation has been found. (Author)

AD-639 895 **Field 3B**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.

FOURIER TRANSORM OF THE SUNSPOT CYCLE,
Environmental research papers,
by Kurt Toman. 4 Mar 66, 6p AFCRL-ERP-218, AFCRL-66-575
Proj. AF-5361
Task 563111
Revision of manuscript submitted 20 Dec 65.
Availability: Published in Journal of Geophysical Research v71 n13 p3285-6 Jul 1 1966.

Descriptors: (*Integral transforms, Astrophysics), (*Sunspots, Periodic variations), Time, Series, Analysis.

The spectral distribution of sinusoidal wavelets is solved analytically. The position of the dominant peak, and its power is determined as a function of truncation length. The influence of phase is illustrated. For short truncation intervals large 'red' and 'blue-shifts' can occur. The results are applied to final Zurich sunspot numbers. (Author)

AD-639 988 **Field 3B**
Not available from CFSTI.
Palomar Observatory, Pasadena, Calif.
ON THE INTERNAL EVOLUTION OF HELIUM STARS,
by George Wallerstein. 26 Apr 65, 5p
Contract AF 49 (638)-1323
Proj. AF-9774
Task 977401
AFOSR-66-1276
Prepared in cooperation with California Univ. San Diego, La Jolla.
Availability: Published in The Astrophysical Journal v142 n3 p1260-2 Oct 1 1965.

Descriptors: (*Stars, Helium), Surface properties, Thermonuclear reactions, Hydrogen, Oxygen, Nitrogen, Carbon.

A possible sequence of thermonuclear reactions leads to the observed surface composition of helium-rich stars. The O18, N14, and C12 abundances are affected by the mixing of He to the surface. (Author)

AD-639 991 **Field 3B**
Not available from CFSTI.
Palomar Observatory, Pasadena, Calif.
THE COMPOSITION OF MAIN-SEQUENCE STARS OF TYPES A-K IN THE HYADES CLUSTER,
by Peter S. Conti, George Wallerstein, and Robert F. Wing. 8 Apr 65, 29p
Contract AF 49 (638)-1323
Proj. AF-9774
Task 977401
AFOSR-66-1256
Prepared in cooperation with Mount Wilson Observatory.
Availability: Published in Astrophysical Journal v142 n3 p999-1023 Oct 1 1965.

Descriptors: (*Stars, Chemical properties), Colors, Temperature, Lithium, Spectroscopy.

The investigation is designed to test the common assumption that all main-sequence stars in a cluster have the same chemical composition. The chemical composition of main-sequence Hyades stars with B-V colors between 0.0 and +0.9 (spectral) types A0V and K2V) were derived. HD 28344 (type G IV) was chosen as the standard star because it has previously been compared to the Sun. The compositions of the other stars are identical to that of HD 28344 with the following exceptions: (1) 68 Tau displays the abundance anomalies of a metallic-line star, and (2) there are wide fluctuations in the lithium content of the Hyades stars. To derive a similar composition for the hottest star (HD 73666 of Praesepe) it is necessary to assume that Praesepe is reddened by at least 0.03 mag. in B-V. For the coolest stars it appears to be necessary to modify the models by including the contribution of line blanketing to the opacity.

Departures from local thermodynamic equilibrium indicated by the low excitation temperatures found for the A stars, apparently have no effect upon the derived abundances. Why HD 73666 and 68 Tau lie above the turnoff point of the color-magnitude diagrams of their clusters is not explained. (Author)

AD-639 992 **Field 3B**
Not available from CFSTI.
Palomar Observatory, Pasadena, Calif.
ABSOLUTE PHOTOELECTRIC SPECTROPHOTOMETRY OF STARS IN THE HYADES,
by J. B. Oke, and Peter S. Conti. 7 Jun 65, 15p
Contract AF 49 (638)-1323
Proj. AF-9774
Task 977401
AFOSR-66-1275
Availability: Published in Astrophysical Journal v143 n1 p134-45 Jan 1966.

Descriptors: (*Stars, Spectroscopy), Temperature, Atmosphere models, Spectrophotometers.

Absolute photoelectric spectrophotometry at selected 50-A bands from lambda 3400 to 10800 has been done for a broad range of stars in the Hyades. High-dispersion spectra have been used to correct the observations so they correspond to absolute fluxes in the continuum. By comparing these fluxes with those computed from model atmospheres, effective temperature versus B-V and effective temperature versus spectral-type relations have been obtained for main-sequence stars with spectral types from AO to KO. Similar data for the Sun put it very near to these relations. Bolometric corrections and line-blanketing measurements are also given. A comparison of the Hyades and 'initial' main sequences with results from stellar-interior computations shows excellent agreement if the mixing-length parameter (l/H (d)) approximately equals 1. (Author)

AD-640 017 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Scientific Research Labs., Seattle, Wash. Mathematics Research Lab.
THE DENSITY OF INTERSTELLAR MATTER NEAR A STAR,
by T. A. Bray, and J. M. A. Danby. Sep 66, 17p
D1-82-0563, Mathematical note-480
Prepared in cooperation with Yale Univ., New Haven, Conn. Observatory.

Descriptors: (*Interstellar matter, Density), Stars, Gravity, Mathematical analysis.

The problem of the gravitational enhancement of the density of interstellar matter near a star is considered, where the temperature of this matter is not zero at great distances from the star. In general this enhanced density will still be less than that of the surrounding particles that are intrinsic to the star itself, and the enhancement of density will not in itself be of prime importance in the discussion of collisions. (Author)

AD-640 197 **Field 3B**
Not available from CFSTI.
New York Univ., N. Y. Dept. of Physics.
THE PULSATIONS OF MODELS OF DELTA CEPHEI STARS. II,
by Norman Baker, and Rudolf Kippenhahn. 19 Apr 65, 25p
Grant AF-AFOSR-62-386
Proj. AF-9767
Task 976703
AFOSR-66-1687
Prepared in cooperation with Inst. for Space Studies, Goddard Space Flight Center, NASA, N. Y. and Max-Planck-Institut fur Physik und Astrophysik, Munich (Germany).
Availability: Published in The Astrophysical Journal v142 n3 p868-889 Oct 1 1965.

Descriptors: (*Variable stars, Models (Simulations)), Periodic variations, Integration, Equations, Stability, Temperature, Oscillation, Integrals, West Germany.

Identifiers: Delti Cephei, Stellar evolution.

The vibrational stability of detailed models of Cephei stars is studied by numerical integration of the linearized non-adiabatic pulsation equations. In contrast to a previous investigation, improvements in the method of integration allow the non-adiabatic calculations to be carried from the surface layers deep into the star. The periods are also determined from the models. It is found that both the period and the stability coefficient can be evaluated to high accuracy on the basis of the outer half (in mass) of the star. A series of fifteen models of 7 solar M lying along a portion of the evolutionary track calculated by Hofmeister, Kippenhahn, and Weigert was investigated. The results confirm the existence of a region of linear instability, due largely to the destabilizing effect of second helium ionization, in a range of mean effective temperatures centered at about 5400K. The hydrogen and first helium ionizations are found to contribute significantly to the destabilizing effect, especially for the overtones. The instability zone is wider in terms of effective temperature than is indicated by observations, and the temperatures of the most unstable models appear to be several hundred degrees lower than the observed temperatures of Cephei stars. (Author)

AD-640 221 **Field 3B**
Not available from CFSTI.
California Univ., Berkeley. Dept. of Astronomy.
STROMUNGSFORMEN VERSCHIEDENER VERTIKALER WELLENLANGEN IN DER SOLAREN WASSERSTOFFKON-VEKTIONSZONE (Higher Convective Vertical Modes and Instability Rates in the Solar Hydrogen Convection Zone),
by K. H. Bohm. 11 Apr 63, 16p
Grant AF-AFOSR-62-199
Proj. AF-9774
Task 977401
AFOSR-66-0370
Text in German.
Availability: Published in Zeitschrift fur Astrophysik v57 p265-77 1963.

Descriptors: (*Solar atmosphere, Convection (Atmospheric)), (*Hydrogen, Sun), Stability, Hydrodynamics, Equations, Matrix algebra, Iterative methods, West Germany.

Higher convective modes and their rates of instability were computed for the model of the solar hydrogen convection zone given by E. Bohm-Vitense (Z. Astrophys. v46 p108 1958). The calculations are based on the linearized hydrodynamic equations. Viscosity and radiative conductivity were neglected. The present computations cover the fundamental, the 1., 2., 3. and 4. mode in the horizontal wavelength range 5000 km > lambda/2 > 170 km. A method of matrix iteration was used for the numerical determination of the higher eigenvalues and eigensolutions of the finite difference-approximations of the hydrodynamic equations. (Author)

AD-640 247 **Field 3B, 4A, 8N**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
INVESTIGATION OF THE FLOWS OF SOLAR PLASMA ON INTERPLANETARY STATION ZOND-2,
by V. V. Bezrukikh, and K. I. Gringauz. 25 Apr 66, 12p FTD-TT-65-1946
TT-66-62412
Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady v163 n4 p873-6 1965.

Descriptors: (*Solar wind, *Plasma medium), Charged particles, Space probes, Instrumentation, Terrestrial magnetism, USSR.

Identifiers: Zond.

On the interplanetary station Zond-2 launched November 30, 1964, there were mounted several traps of charged particles intended for measurements of flows of charged particles close to the Earth and the determination of the magnitude of the flows of the solar plasma and their energy spectra. In this report there are presented preliminary data of measurements effected on the station Zond-2 with the aid of a modulation trap and one of the integral traps of charged particles in the course of the first half of December 1964. (Author)

AD-640 407 **Field 3B, 20I**
CFSTI Prices: HC$1.00 MF$0.50
Avco-Everett Research Lab., Everett, Mass.
LABORATORY MODELING OF THE SOLAR WIND.
Interim scientific rept.,
by R. M. Patrick, and E. R. Pugh. Aug 66, 17p
AMP-204
Contract AF 49 (638)-1483
Proj. AF-9752
Task 975201
AFOSR-66-2055

Descriptors: (*Solor wind, Simulation), Laboratory equipment, Plasma physics, Magnetohydrodynamics.

The IMP satellite measurement and a theoretical study indicate that the solar wind interaction with the earth's B field has properties similar to a continuum flow. This has motivated us to build a laboratory facility which simulates this flow, and produces a steady flow of collisionless plasma with a large diameter compared to the ion gyro radii. A description of this facility, the design criteria and some results of flow studies will be given. (Author)

AD-640 495 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
Manchester Coll. of Science and Technology (England). Dept. of Physics.
LABORATORY SIMULATION OF LUNAR LUMINESCENCE.
Scientific summary rept. no. 2, Mar 65-Mar 66,
by J. E. Geake. Apr 66, 14p
Contract AF 61 (052)-798
AFCRL-66-665
See also AD-620 507.

Descriptors: (*Lunar environment, *Luminescence), (*Meteorites, Luminescence), Minerals, Neutron activation, Analysis, Proton bombardment, Excitation, Radiation damage, Continuous spectrum, Heating, Great Britain.

The report concerns mainly further investigation of the proton-excited luminescence of meteoritic material. The source of the different types of luminescence from the enstatite achondrites was elucidated by neutron activation analysis, and the characteristic luminescence spectra of difference classes of meteorites were investigated. The effect of proton damage both on the efficiencies and on the spectra were investigated; it was also found that heating produces recovery from damage, and this process is being studied.

AD-640 532 **Field 3B**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
RADAR ASTRONOMY AT MILLIMETER AND SUBMILLIMETER WAVELENGTHS,
by James W. Meyer. 1 Oct 65, 11p JA-2677
Contract AF 19 (628)-5167
ESD-TR-66-378
Availability: Published in Proceedings of the IEEE v54 n4 p484-92 Apr 1966.

Descriptors: (*Radio astronomy, Scientific research), Millimeter waves, Submillimeter waves, Moon, Radar echo areas.

The scant two-decade existence of radar astronomy has seen important contributions by this new

technique to positional astronomy, to the metrics of the solar system, and to the study of lunar and planetary surfaces. The role of millimeter wavelengths in this new astronomy is discussed and the problems unique to these short wavelengths defined. Brief mention is made of the importance of correlation of active and passive measurements and important new millimeter wave component requirements are listed. The implementation of an eight-millimeter radar capable of detecting the moon is described. At the eight-millimeter wavelength, the moon is found to be generally rough and has a radar cross section of about seven percent of its projected geometrical area. Methods of improving these measurements and their feasibility are outlined. Future equipment configurations capable of extending millimeter wave measurements can be implemented, given critical component development success. (Author)

N66-27006 **Field 3B**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
VIBRATIONS OF THE UNIVERSE.
by E. R. Harrison. Mar 66, 90p NASA-TM-X-55477, X-641-66-103
Submitted For Publication

Descriptors: *Mathematical model, *Time dependency, *Universe, *Vibration, Density, Dependency, Fluctuation, Homogeneity, Isotropic, Mathematics, Mode, Model, Perturbation, Structure, Time.

For abstract, see S 04 15.

N66-27045 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
California Inst. Of Tech., Pasadena.
NEUTRON STARS. I - PROPERTIES AT ABSOLUTE ZERO TEMPERATURE.
by J. N. Bahcall, and R. A. Wolf. 1965, 24p NASA-CR-67872
Contracts NGR-05-002-028, NONR-220/47/
Submitted For Publication

Descriptors: *Astrophysics, *Cryogenic temperature, *Neutron star, *Stellar structure, Cryogenic, Energy, Equation, Ground, Heat, Interaction, Neutron, Nucleon, Property, Proton, Simulation, Specific, Spectrum, Star, State, Stellar, Structure, Temperature.

For abstract, see S 04 15.

N66-27054 **Field 3B**
CFSTI Prices HC$5.00 MF$1.00
Grumman Aircraft Engineering Corp., Bethpage, N. Y.
PHOTOMETRIC MEASUREMENTS OF SIMULATED LUNAR SURFACES FINAL REPORT.
by J. D. Halajian, and F. A. Spagnolo. Apr 66, 166p NASA-CR-65365, RE-245
Contract NAS9-3182

Descriptors: *Lunar surface, *Optical property, *Photometry, Albedo, Backscatter, Brightness, Light, Lunar, Measurement, Model, Moon, Optical, Simulation, Surface.

For abstract, see S 04 15.

N66-27186 **Field 3B**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration, Washington, D. C.
PHYSICS OF METEORS.
Physique Des Meteores
by J. Delcourt. Feb 64, 76p NASA-TT-F-8802
Transl. Into English Of Groupe De Rech. Ionospheriques Tech. Note 16, 22 Nov. 1963

Descriptors: *Meteor, *Radio meteorology, Heating, Ionization, Luminosity, Melting, Meteorology, Physical, Radio, Synthesis, Theory, Vaporization.

For abstract, see S 04 15.

N66-27192 **Field 3B**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration, Washington, D. C.
RADIO EMISSIONS AND THE NATURE OF THE MOON.
Radioizlucheniye I Priroda Luny
by V. D. Krotikov, and V. S. Troitskiy. Mar 64, 73p NASA-TT-F-8837
Transl. Into English From Usp. Fiz. Nauk (Moscow), V. 81, No. 4, Dec. 1963 P 589-639

Descriptors: *Moon, *Physical property, *Radio emission, Crust, Effect, Emission, Lunar, Physical, Property, Radiation, Radio, Surface, Temperature, Thermal.

For abstract, see S 04 15.

N66-27238 **Field 3B**
CFSTI Prices HC$4.00 MF$0.75
Geophysics Corp. Of America, Bedford, Mass.
THE METEOROLOGY OF MARS AND VENUS FINAL REPORT.
by E. M. Brooks, J. Mariano, and G. Ohring. Mar 64, 116p NASA-CR-75315, GCA-TR-64-4-N
Contract NASW-704

Descriptors: *Atmosphere model, *Mars atmosphere, *Meteorology, *Venus atmosphere, Absorption, Atmosphere, Budget, Carbon dioxide, Effect, Greenhouse, Infrared, Mars (planet), Model, Planetary, Radiation, Solar, Temperature, Tide, Venus.

For abstract, see S 04 15.

N66-27244 **Field 3B**
CFSTI Prices HC$8.00 MF$1.00
Iit Research Inst., Chicago, Ill. Technology Center.
STUDIES OF LUNAR SOIL MECHANICS FINAL REPORT, 15 DEC. 1965 - 1 MAR. 1966.
by J. D. Nelson, and E. Vey. May 66, 163p NASA-CR-75323
Contract NASR-65/02/

Descriptors: *Lunar soil, *Ultrahigh vacuum, *Vacuum effect, Adsorption, Clean, Effect, Enstatite, Gas, Lunar, Obsidian, Olivine, Penetration, Powder, Property, Quartz, Resistance, Sand, Shear, Simulation, Soil, Strength, Surface, Test, Ultrahigh, Vacuum.

For abstract, see S 04 15.

N66-27534 **Field 3B**
CFSTI Prices HC$2.00 MF$0.50
Grumman Aircraft Engineering Corp., Bethpage, N. Y. Research Dept.
GEOMETRY OF BACKSCATTERING SURFACES AS APPLIED TO THE MOON.
by J. D. Halajian. Dec 65, 49p NASA-CR-75426, RE-219J/PHASEII/
Contract NAS9-3182
Presented At The 4th Ann. Meeting Of The Working Group On Extraterrest. Resources, Colorado Springs, 29 Nov. - 2 Dec. 1965

Descriptors: *Backscatter, *Lunar surface, *Photometry, *Surface geometry, Geometry, Light, Lunar, Model, Moon, Reflection, Scattering, Surface.

For abstract, see S 04 15.

N66-27541 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
California Inst. Of Tech., Pasadena.
INVESTIGATION OF THE PROBLEMS OF LUNAR AND PLANETARY EXPLORATION ANNUAL REPORT, 1 DEC. 1964 - 30 NOV. 1965.
by H. Brown, and B. C. Murray. 25 Apr 66, 21p NASA-CR-75342
Grant NSG-56-60

Descriptors: *Lunar exploration, *Planetary exploration, Asteroid, Chemistry, Distribution, Exploration, Infrared, Lunar, Meteorite, Moon, Observation, Orbital, Planet, Planetary, Powder, Property, Radiation, Thermal, Vacuum, Visible.

For abstract, see S 04 15.

N66-27755 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
Georgetown Univ., Washington, D. C. Coll. Observatory.
SPECTROSCOPIC STUDY OF SOLAR AND PLANETARY ATMOSPHERES SEMIANNUAL STATUS REPORT NO. 6, AUG. 1, 1965 - FEB. 1, 1966.
by F. J. Heyden. 1966, 16p NASA-CR-75488
Grant NSG-362

Descriptors: *Mars atmosphere, *Nitrogen oxide, *Planetary atmosphere, *Solar atmosphere, *Spectral analysis, Absorption, Analysis, Atmosphere, Band, Infrared, Jupiter (planet), Mars, Measurement, Nitrogen, Oxide, Planetary, Reflectivity, Region, Simulation, Solar, Spectral, Spectrum, Venus, Visible, Wavelength.

For abstract, see S 04 15.

N66-27937 **Field 3B**
CFSTI Prices HC$3.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
VENUS - PRELIMINARY SCIENCE OBJECTIVES AND EXPERIMENTS FOR USE IN ADVANCED MISSION STUDIES.
by R. G. Brereton. 22 Dec 65, 57p NASA-CR-75609, EPD-328
Contract NAS7-100

Descriptors: *Experiment design, *Flyby mission, *Space capsule, *Venus probe, Atmosphere, Biology, Capsule, Composition, Cosmic, Design, Dust, Experiment, Flyby, Infrared, Magnetometer, Microwave, Mission, Occultation, Particle, Probe, Radiation, Solar, Space, Spectroscopy, Ultraviolet, Venus.

For abstract, see S 04 15.

N66-28011 **Field 3B**
CFSTI Prices HC$5.00 MF$1.25
Cutler-hammer, Inc., Deer Park, N. Y.
INVESTIGATION OF NEW IONOSOUNDER TECHNIQUES.
Jun 66, 182p NASA-CR-493
Contract NAS5-9108

Descriptors: *Flyby mission, *Ionospheric composition, *Planetary atmosphere, Atmosphere, Composition, Field, Flyby, Instrumentation, Ionospheric, Magnetic, Mars, Mission, Orbit, Planetary, Profile, Venus, Voyager project.

For abstract, see S 04 15.

N66-28366 **Field 3B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
REGULARITIES IN COMPOSITION AND STRUCTURE OF METEORITES AND PROBLEM OF THEIR ORIGIN.
Zakonomernosti V Sostave I Stroyenii Meteoritov I Problema Ikh Proiskhozhdeniya
by A. A. Yavnel. May 66, 21p NASA-TT-F-10128
Transl. Into English From Meteoritika (Moscow), No. 26, 1965 P 26- 34

Descriptors: *Chemical composition, *Gallium compound, *Germanium compound, *Meteorite, Asteroid, Chemical, Composition, Compound, Cooling, Gallium, Germani-

um, Grain, Iron, Kamacite, Nickel, Origin, Rate.

For abstract, see S 04 15.

N66-28655 Field 3B
CFSTI Prices HC$4.00 MF$1.00
Ewen Knight Corp., East Natick, Mass.
RADIO OBSERVATIONS OF THE MOON AND VENUS AT 8.6 MM WAVELENGTH FINAL REPORT, MAY 1, 1962 - NOV. 1, 1965.
1965, 136p NASA-CR-75313
Contract NASW-593

Descriptors: *Lunar surface, *Moon, *Planetary surface, *Radiation intensity, *Radio observation, *Surface temperature, *Thermal radiation, *Venus, Astrophysics, Intensity, Lunar, Observation, Planetary, Radiation, Radio, Surface, Temperature, Thermal.

For abstract, see S 04 16.

N66-29348 Field 3B
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
VELOCITY AND ENERGY OF THE TUNGUS METEORITE.
O Skorosti I Energii Tungusskogo Meteorita
by V. A. Bronshten, and K. P. Stanyukovich. Nov 61, 8p NASA-TT-F-8174
Transl. Into English From Dokl. Akad. Nauk Sssr (Moscow), V. 140, No. 3, 1961 P 583-586

Descriptors: *Explosion, *Impact damage, *Kinetic energy, *Tungusk meteorite, *Velocity measurement, Body, Damage, Energy, Impact, Kinetic, Mass, Measurement, Meteorite, Parameter, Radiation, Shock, Spectrum, Temperature, Tree, Ultraviolet, Velocity, Wave.

For abstract, see S 04 16.

N66-29372 Field 3B
CFSTI Prices HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
A REVIEW OF LUNAR AND PLANETARY MAGNETIC FIELD MEASUREMENTS USING SPACE PROBES.
by E. J. Smith. 1965, 37p NASA-CR-67604
Contract NAS7-100
Submitted For Publication

Descriptors: *Lunik ii lunar probe, *Magnetic dipole, *Planetary magnetic field, *Solar wind, *Space probe, Boundary, Data, Dipole, Field, Interaction, Lunar, Magnetic, Mariner space probe, Mars, Measurement, Moon, Physics, Planetary, Plasma, Probe, Solar, Space, Strength, Venus, Wind.

For abstract, see S 04 16.

N66-29398 Field 3B
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
PLANETARY SPECTRA.
Spektry Planet
by V. G. Teyfel. May 64, 16p NASA-TT-F-8881
Transl. Into English From Priroda (Moscow), No. 6, Jun. 1961 P 39-45

Descriptors: *Lunar surface, *Planetary atmosphere, *Radio emission, *Spectral analysis, Analysis, Astronomy, Atmosphere, Data, Emission, Luminescence, Lunar, Mars surface, Observation, Planet, Radio, Saturn, Spectroscopy, Spectrum, Surface, Telescope, Venus atmosphere.

For abstract, see S 04 16.

N66-29410 Field 3B
CFSTI Prices HC$2.00 MF$0.50
Cambridge Univ. (England).
A RADICAL DEPARTURE FROM THE "STEADY STATE" CONCEPT IN COSMOLOGY.
by F. Hoyle, and J. V. Narlikar. 1965, 29p
NASA-CR-67871
Contracts NGR-05-002-028, NONR-220/47/
Submitted For Publication Prepared Jointly With Calif. Inst. Of Tech.

Descriptors: *Astrophysics, *Cosmology, *Steady state, *Stellar evolution, Cosmic, Creation, Evolution, Formation, Galaxy, High energy, Origin, Particle, Radiation, Radio, Source, State, Steady, Stellar, Theory, Universe.

For abstract, see S 04 16.

N66-29411 Field 3B
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A THEORY OF THE ORIGIN AND EVOLUTION OF CONTACT BINARIES.
by S.-S. Huang. 1965, 29p NASA-TM-X-56745
Submitted For Publication

Descriptors: *Angular momentum, *Binary star, *Force line, *Magnetic field, *Mass transfer, *Stellar evolution, Angular, Axial, Binary, Component, Contact, Dissipation, Ejection, Field, Force, Line, Magnetic, Momentum, Orbital, Rotation, Star.

For abstract, see S 04 16.

N66-29515 Field 3B
CFSTI Prices HC$1.00 MF$0.50
Chicago Univ., Ill. Enrico Fermi Inst. For Nuclear Studies.
SPECTRAL SHIFTS IN QUASISTELLAR OBJECTS.
by J. R. Jokipii, P. D. Noerdlinger, and L. Woltjer. 1966, 18p NASA-CR-75945, EFINS-66-56
Grants NSG-96-60, NSG-179-61

Descriptors: *Astrophysics, *Frequency distribution, *Galaxy, *Red shift, *Star, Blue, Distribution, Euclidean space, Frequency, Quasi-stellar, Red, Relativity, Shift, Velocity.

For abstract, see S 04 16.

N66-29522 Field 3B
CFSTI Prices HC$1.00 MF$0.50
Chicago Univ., Ill. Enrico Fermi Inst. For Nuclear Studies.
THE SPECTRAL SHIFTS OF AN ENSEMBLE OF RELATIVISTIC EMITTERS.
by J. R. Jokipii, and P. D. Noerdlinger. 1966, 14p NASA-CR-75829, EFINS-66-51
Grants NSG-96-60, NSG-179-61

Descriptors: *Doppler effect, *Radiation emission, Blue, Emission, Emitter, Nuclear, Physics, Radiation, Red, Relative, Shift, Spectral.

For abstract, see S 04 16.

N66-29681 Field 3B
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
SPECTROPHOTOMETRIC INVESTIGATION OF THE MECHANISM OF THE EXCITATION OF FILAMENTARY NEBULAS.
Spektrofotometricheskoye
I ssledovaniye Mekhanizma Vosbuzhdeniya Voloknistykh Tumannostey
by S. B. Pikelner. Jul 66, 49p NASA-TT-F-8790
Transl. Into English From Izv. Krymsk. Astrofiz. Observ. (Moscow), V. 12, 1954 P 93-117

Descriptors: *Excitation, *Nebula, *Spectrometry, Astrophysics, Filament, Gas, Interstellar, Ionization, Light, Mechanism, Radiation, Spectrum.

For abstract, see S 04 16.

N66-29721 Field 3B
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
BALANCE OF ENERGY AND STRUCTURE OF THE CHROMOSPHERE.
by E. YE. Dubov. Jul 66, 28p NASA-TT-F-8793
Transl. Into English From Izv. Krymsk. Astrofiz. Observ. (Moscow), V. 22, 1960 P 101-117

Descriptors: *Compression wave, *Disturbance theory, *Energy level, Balance, Chromosphere, Compression, Disturbance, Energy, Heat, Level, Relation, Solar, Structure, Theory, Wave.

For abstract, see S 04 16.

N66-29732 Field 3B
CFSTI Prices HC$3.00 MF$0.50
Rand Corp., Santa Monica, Calif.
RADIATIVE-CONVECTIVE EQUILIBRIUM CALCULATIONS FOR A TWO-LAYER MARS ATMOSPHERE.
by C. B. Leovy. May 66, 55p NASA-CR-75633, RM-5017-NASA
Contract NASR-21/07/

Descriptors: *Computer simulation, *Equilibrium, *Mars atmosphere, *Radiation effect, *Turbulent heat transfer, Atmosphere, Calculation, Carbon dioxide, Computer, Convection, Effect, Flux, Ground, Heat, Heat transfer, Layer, Mars, Model, Radiation, Radiative, Simulation, Soil, Turbulence, Two.

For abstract, see S 04 16.

N66-35651 Field 3B
CFSTI Prices HC$2.50 MF$0.75
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
A DIGITALIZED SOLAR ULTRAVIOLET SPECTRUM.
by C. A. Barth, R. T. Brinkmann, and A. E. Green. 15 Aug 66, 84p NASA-CR-77556, JPL-TR-32-951
Contract NAS7-100

Descriptors: *Digital data, *Rocket sounding, *Solar spectrum, *Ultraviolet spectrum, *Upper atmosphere, Atmosphere, Conversion, Data, Digital, Experiment, Form, Rocket, Solar, Sounding, Spectrum, Ultraviolet, Upper.

For abstract, see S 04 21.

N66-35729 Field 3B
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Inst. For Space Studies, New York.
SOLAR EVOLUTION WITH VARYING G.
by A. G. Cameron, and D. Ezer. 1965, 50p
NASA-TM-X-56937

Descriptors: *Cosmology, *G force, *Sun, Burn, Depletion, Evolution, Flux, Helium, Hydrogen, Lithium, Luminosity, Model, Neutrino, Solar, Variation.

For abstract, see S 04 21.

N66-35959 Field 3B
CFSTI Prices HC$2.50 MF$0.75
Grumman Aircraft Engineering Corp., Bethpage, N. Y. Geo-astrophysics Section.
POLARIMETRIC MEASUREMENTS OF SIMULATED LUNAR SURFACES THIRD INTERIM REPORT.
by W. G. Egan, and L. L. Smith. Mar 66, 75p
NASA-CR-77764, RM-315
Contract NAS9-4942

Descriptors: *Lunar landing site, *Lunar surface, *Polarimetry, Apollo project, Ash, Blue, Furnace, Green, Infrared, Landing, Lunar, Measurement, Simulation, Site, Slag, Surface, Visual, Volcanic.

For abstract, see S 04 21.

N66-36047 **Field 3B**
CFSTI Prices HC$3.00 MF$0.75
Grumman Aircraft Engineering Corp., Bethpage, N. Y. Research Dept.
POLARIMETRIC MEASUREMENTS OF SIMULATED LUNAR SURFACES (PHASE II) SECOND INTERIM REPORT.
by W. G. Egan, and L. L. Smith. Feb 66, 73p
NASA-CR-77767, RM-312
Contract NAS9-4942

Descriptors: *Albedo, *Lunar surface, *Polarization, *Slag, *Surface property, Ash, Furnace, Lunar, Material, Measurement, Particle, Polarimeter, Porosity, Property, Simulation, Size, Surface.

For abstract, see S 04 21.

N66-36130 **Field 3B**
CFSTI Prices HC$1.50 MF$1.00
National Aeronautics And Space Administration, Washington, D. C.
PLANETARY ATMOSPHERES - A CONTINUING BIBLIOGRAPHY, FEBRUARY 1965 - MAY 1966.
Aug 66, 135p NASA-SP-7017/01/
With Indexes

Descriptors: *Bibliography, *Extraterrestrial environment, *Planetary atmosphere, Annotation, Astronomy, Atmosphere, Entry, Environment, Exploration, Extraterrestrial, Jupiter (planet), Mars (planet), Mercury (planet), Meteorology, Observation, Origin, Photography, Photometry, Physical, Planetary, Property, Saturn (planet), Spacecraft, Spectroscopy, Theory, Venus.

For abstract, see S 04 21.

PB-170 896 **Field 3B**
CFSTI Prices: HC$4.00 MF$0.75
Smithsonian Astrophysical Observatory, Cambridge, Mass.
THE POLARIZATION OF CELESTIAL X-RAYS.
Special rept., on research in Space Science,
by Joseph F. Dolan. 20 May 66, 115p 4-66-5, SAO-SR-212

Descriptors: (*X rays, Polarization), (*Radio astronomy, X rays), Magnetic fields, Bremsstrahlung, Electrons, Stars, Electron transitions, Compton scattering, Polariscopes, Spaceborne.

The processes by which X-radiation may be emitted by celestial sources are investigated, and the net polarization such radiation would possess is predicted. Highly polarized X-radiation would suggest synchrotron emission as the source mechanism. Radiation whose polarization is low but nonzero would be produced by synchrotron emission from a source whose magnetic fields are inhomogeneous on a large scale, or by bremsstrahlung of electrons whose velocity vectors lie in one predominant direction. Nonobservable polarization would result from sources of synchrotron radiation whose magnetic fields showed small-scale irregularities, from the bremsstrahlung of electrons whose velocity vectors are either random or spherically symmetric in direction over the entire source, or from sources whose mechanism of producing the radiation imparts no net polarization, e.g., thermal radiation from neutron stars, line radiation from electronic-shell transitions within atoms, and the inverse Compton effect. The various experimental methods of measuring the linear polarization of X-radiation are considered, and the Borrmann effect (the anomalous transmission of X-rays through a perfect crystal) is experimentally investigated. Results indicate that a satellite-borne polarimeter employing the Borrmann effect is a feasible means of determining whether celestial X-ray sources possess any significant polarization. (Author)

PB-170 900 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
Smithsonian Astrophysical Observatory, Cambridge, Mass.
A SUGGESTION AS TO THE ORIGIN OF CHONDRULES.
Special rept. on Research in Space Science,
by Fred L. Whipple. 28 Mar 66, 12p 3-66-34, SAO-SR-206

Descriptors: (*Meteorites, Theory), Nebulae, Dust, Rock (Geology), Melting, Energy, Lightening, Plasma physics, Asteroids.

Identifiers: Chondrules.

Consideration is given to the possibility of chondrule formation in the primeval dust atmospheres that would probably be present in the proximity of asteroids during their formation from a Laplace-type nebula. It is proposed that lightning may have functioned as the necessary energy source, and the physical conditions required for lightning production are worked out in some detail.

PB-170 903 **Field 3B**
CFSTI Prices: HC$4.00 MF$1.00
Smithsonian Astrophysical Observatory, Cambridge, Mass.
FLUCTUATIONS AND CORRELATIONS IN THE EXPANDING UNIVERSE.
Special rept. on Research in Space Science,
by Peter G. Eltgroth. 24 Jan 66, 136p SAO-SR-197

Descriptors: (*Galaxies, Theory), (*Interstellar matter, Theory), Gravity, Electrostatics, Density, N-body problem, Plasma medium, Energy, Astronomy.

Identifiers: Expanding universe theory, Cosmology.

The paper attempts to discover the effects of fluctuations and correlations arising from the forces present in the expanding universe. The gravitational and coulomb forces are most important after the density of the expanding universe falls below nuclear density (approx. 10 to the 15th power g/cu cm). Both forces are considered. (Author)

AD-639 684 **See Field 3A**

AD-639 889 **See Field 4A**

AD-639 892 **See Field 20N**

AD-639 897 **See Field 17E**

AD-639 957 **See Field 22C**

3C. CELESTIAL MECHANICS

AD-639 907 **Field 3C**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
A NECESSARY CONDITION FOR STABILITY OF ORBITAL MOTION.
Translation series,
by K. V. Kholshevnikov. 16 Aug 66, 7p.TG-230-T486
Contract NOw-62-0604
TT-66-62382
Trans. of Leningrad Univ. Vestnik (USSR), v21 n1, Seriya Matematiki, Mekhaniki i Astronomii, n1 p172-3 1966.

Descriptors: (*Planets, Orbital trajectories), (*Orbital trajectories, Stability), Motion, Celestial mechanics, Mathematical analysis, USSR.

AD-639 990 **Field 3C**
Not available from CFSTI.
Palomar Observatory, Pasadena, Calif.
STUDIES OF STELLAR ROTATION. III. A REDETERMINATION OF ROTATIONAL VELOCITIES IN THE PLEIADES.
Revised ed.,
by Christopher M. Anderson, Robert Stoeckly, and Robert P. Kraft. 2 Aug 65, 9p
Contract AF 49 (638)-1323
Proj. AF-9774
Task 977401
AFOSR-66-1254
Revision of manuscript submitted 18 Jun 65. Prepared in cooperation with Mount Wilson Observatory.
Availability: Published in Astrophysical Journal v143 n2 p299-305 Feb 1966.

Descriptors: (*Stars, Rotation), Velocity, Binary stars.

A redetermination of the rotational velocities of fifty-seven Pleiades members down to spectral type approximately F5 V was made. The function (V sin i) for the Pleiades is shown to be always larger than that for the field stars regardless of absolute magnitude. This conclusion appears to support the Abt-Hunter hypothesis that high rotation is accompanied by a low frequency of spectroscopic binaries with P < 100 days. (Author)

N66-27071 **Field 3C**
CFSTI Prices HC$2.00 MF$0.50
Cambridge Univ. (England).
ON THE EFFECTS OF THE NON-CONSERVATION OF BARYONS IN COSMOLOGY.
by F. Hoyle, and J. V. Narlikar. 1965, 35p
NASA-CR-67874
Contracts NGR-05-002-028, NONR-220/47/
Submitted For Publication Prepared Jointly With Calif. Inst. Of Tech.

Descriptors: *Baryon, *Cosmology, *Steady state, Effect, Gravity, Lepton, Meson, Nonconservative, Particle, Physics, Quantum, State, Steady, Theory.

For abstract, see S 04 15.

N66-27084 **Field 3C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
DETERMINATION OF MEAN ELEMENTS FOR VINTI'S SATELLITE THEORY.
by N. L. Bonavito. 1965, 13p NASA-TM-X-56774
Submitted For Publication

Descriptors: *Orbital element, *Satellite orbit, *Vinti theory, Coefficient, Differential, Element, Equation, Hamiltonian, Mean, Motion, Orbit, Orbital, Prediction, Satellite.

For abstract, see S 04 15.

N66-27191 **Field 3C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
IN QUEST OF SIGNS OF CIVILIZATION IN OTHER WORLDS.
O Poiskakh Sledov Tsivilizatsii V Inykh Mirakh
by M. A. Voronin. Mar 64, 9p NASA-TT-F-8590
Transl. Into English From Priroda (Moscow), No. 11, 1962 P 78-83

Descriptors: *Extraterrestrial life, Civil, Communication, Existence, Extraterrestrial, Human, Life, Radio, Search.

For abstract, see S 04 15.

N66-27306 **Field 3C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
RESEARCH ACHIEVEMENTS REVIEW SERIES NO. 20 - MATHEMATICS AND COMPUTATION RESEARCH.
1966, 31p NASA-TM-X-53420

Descriptors: *Celestial mechanics, *Computer programming, *Numerical integration, Analysis, Body, Celestial, Computer, Differential, Equation, Integration, Kepler law, Language, Mechanics, Method, Numerical, Problem, Programming, Standardization, Three, Trajectory.

For abstract, see S 04 15.

N66-35779 **Field 3C**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
ON THE ACCUMULATION OF ERRORS AT NUMERICAL INTEGRATION IN SOME PROBLEMS OF CELESTIAL MECHANICS.
O Nakoplenii Oshibok Pri Chislennom Integrirovanii V Nekotorykh Zadachakh Nebesnoy Mekhaniki
by A. S. Sochilina. 25 Apr 66, 14p NASA-CR-77703, ST-CM-10480
Contract NAS5-9299
Transl. Into English From Byul. Inst. Teor. Astron. (Ussr), V. 7, No. 4, 1959 P 281-286

Descriptors: *Celestial mechanics, *Error function, *Motion equation, *Numerical integration, Celestial, Computer, Equation, Error, Estimate, Function, Integration, Mechanics, Motion, Numerical, Planetary.

For abstract, see S 04 21.

AD-468 941 **See Field 22C**

AD-479 942 **See Field 22C**

AD-639 684 **See Field 3A**

AD-639 696 **See Field 22C**

AD-639 890 **See Field 4A**

AD-640 220 **See Field 22C**

4A. ATMOSPHERIC PHYSICS

AD-639 676 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
Woods Hole Oceanographic Institution, Mass.
CUMULUS CONVECTION AND ITS INTERACTION WITH LARGER SCALES OF MOTION,
by Joseph Levine. Sep 66, 20p Ref-66-49
Grant NSF-GP-1451
See also AD-639 677.

Descriptors: (*Cumulus clouds, Convection (Atmospheric)), Wind, Data, Meteorological parameters, Moisture, Particle size, Velocity, Drops.

Identifiers: Stormfury 1965 operation.

An outline of work done at the Woods Hole Oceanographic Institution with National Science Foundation support since 1963 on cumulus convection as related to larger scale atmospheric motions is given. In addition a preliminary analysis of the meso-scale wind field as derived from aircraft Doppler wind observation taken during one day of the Stormfury 1965 operation is described. Such facts as scale and magnitude of meso-scale divergence and vertical velocity in the trades are inferred. (Author)

AD-639 677 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
Woods Hole Oceanographic Institution, Mass.
DATA REDUCTION OF STORMFURY 1965 CLOUD OBSERVATIONS MADE FROM RESEARCH FLIGHT FACILITY AIRCRAFT.
Final rept.,
by Joseph Levine. Sep 66, 14p Ref-66-50
Contract Cwb-11255
See also AD-639 676.

Descriptors: (*Cumulus clouds, Convection (Atmospheric)), Wind, Data, Meteorological parameters, Moisture, Particle size, Velocity, Reduction, Drops.

Identifiers: Stormfury 1965 operation.

The data reduction procedures used on the observations obtained from the ESSA Research Flight Facility aircraft during the Stormfury 1965 operation is described. The results to be obtained eventually are cloud liquid water content, volume median drop size, turbulent vertical velocity, and buoyancy fluctuations in cloud passes made by the aircraft. (Author)

AD-639 694 **Field 4A**
CFSTI Prices: HC$3.00 MF$0.75
Utah Univ., Salt Lake City. Upper Air Research Labs.
A SOFT ELECTRON SPECTROMETER FOR AURORAL RESEARCH,
by D. F. Stout. Aug 66, 94p Scientific-5, UU-66-9
Contract AF 19 (628)-4995
Projs. AF-7663, 5710
Task 766303
AFCRL-66-604

Descriptors: (*Aurorae, Spectroscopy), (*Electrons, *Spectrum analyzers), Sounding rockets, Instrumentation, Particle trajectories, Secondary emission, Electrostatics, Electron optics, Band spectrum, Energy, Electron multipliers, Probes.

A few of the problems associated with the measurement of electron directional flux inside an aurora by a rocket probe are analyzed. The trajectories of electrons with energies between 40 ev and 10 kev are studied and their interference with the rocket is examined. It is found that a serious measurement problem exists if the electron detection device is mounted incorrectly on the rocket. Secondary electrons below 1 kev energy are also found to be a problem. A partial solution to these problems is presented; and since the problems cannot be completely eliminated, a few methods are proposed to correct the erroneous data which they cause. A design procedure for an instrument capable of obtaineing an electron spectrum by electrostatic selection is shown. Deflection plates with cylindrical geometry are found to offer certain advantages for the present system. The resulting deflection system geometry is able to resolve 6 bands of electron energies with band centers at 59.3, 149, 362, 910, 2275, and 5680 ev. A new device, the curved channel electron multiplier, is used to detect individual electrons. A brief outline of its theory of operation is presented and the advantages of this multiplier for sounding rocket experiments are also discussed. (Author)

AD-639 823 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
BALLOON-BORNE MASS SPECTROMETER MEASUREMENTS OF THE CONSTITUENTS OF THE ATMOSPHERE TO 28 KILOMETERS.
Environmental research papers,
by Rocco S. Narcisi, Robert A. Langley, Herbert A. Cohen, and John M. Elwell. May 66, 34p
AFCRL-ERP-197, AFCRL-66-339
Proj. AF-6687
Task 668701

Descriptors: (*Mass spectroscopy, Atmosphere), Meteorological balloons, Spectrum analyzers, Helium, Oxygen, Argon, Nitrogen, Gas analysis, Measurement.

To determine the feasibility of making mass spectrometric measurements of the lower atmosphere, balloon flights have been made to an altitude of 28 km with a time-of-flight mass spectrometer. Composition measurements were obtained, and some of the problems of extending the range and accuracy of measurements resolved. (Author)

AD-639 879 **Field 4A, 20H**
Not available from CFSTI.
Center for Radiophysics and Space Research, Cornell Univ., Ithaca, N. Y.
COSMIC RAY ELECTRONS AND POSITRONS,
by W. I. Axford. 4 Apr 66, 5p
Contract AF 49 (638)-1527, Grant NsG-382
Proj. AF-9767
Task 976702
AFOSR-66-1867
Availability: Published in Planet. Space Sci. v14 p652-3 1966.

Descriptors: (*Cosmic rays, Charged particles), (*Electrons, Cosmic rays), (*Positrons, Cosmic rays), Intensity, Nuclear spectroscopy, Energy.

An examination is made of the information that can be extracted from observations of the intensity and spectra of cosmic ray electrons and positrons. It is shown that the positron component can be used to estimate the mean confinement time of both cosmic ray electrons and positrons. It is also shown that with sufficiently accurate observations of the positron and electron spectra the contributions due to rigidity dependent and irreversible energy loss modulation mechanisms can be separated. It is emphasized that observations of positron and electron spectra are well worth pursuing because of their significant information content. (Author)

AD-639 889 **Field 4A, 3B**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
GENERAL BEHAVIOR OF 6300 A (OI) AT SACRAMENTO PEAK, NEW MEXICO.
Environmental research papers,
by W. Bellew, and S. Silverman. 7 Dec 65, 12p
AFCRL-ERP-211, AFCRL-66-415
Proj. AF-7661
Task 766102
Prepared in cooperation with Northeastern Univ., Boston, Mass.
Availability: Published in Planetary and Space Science v14 p407-16 1966.

Descriptors: (*Sky brightness, *New Mexico), Line spectrum, Aurorae, Magnetic storms, Diurnal variations.

The phenomenological behavior of the 6300 A (OI) airglow emission as observed at Sacramento Peak, New Mexico is described. It was found that the general behavior can be classified in three groups: (1) the monotonic decrease during the night, typical of temperate latitude stations, on days with no or little magnetic disturbance; (2) a variable emission occurring on magnetically disturbed nights; and (3) a variation with a maximum during the night, usually to the south, which appears to be a northern extension of the equatorial behavior. (Author)

AD-639 890 **Field 4A, 3C**
Not available from CFSTI.
Airforce Cambridge Research Labs., L. G. Hanscom Field, Mass.
ZENITH SKYLIGHT INTENSITY AND COLOR DURING THE TOTAL SOLAR ECLIPSE OF 20 JULY 1963.
Environmental research papers,
by William E. Sharp, John W. F. Lloyd, and S. M. Silverman. 20 Dec 65, 8p AFCRL-ERP-219, AFCRL-66-576
Proj. AF-7661
Task 766102

Prepared in cooperation with Northeastern Univ., Boston, Mass.
Availability: Published in Applied Optics v5 n5 p787-92 May 1966.

Descriptors: (*Solar eclipses, *Sky brightness), Maine, Intensity, Colors, Night sky.

The zenith skylight intensity was measured, with a resolution of 10 A, over the wavelength range from 5200 A to 6400 A during a total solar eclipse at Hermon, Maine. The intensity was found to change by about two orders of magnitude in the 2-min period before totality and reached a minimum during totality of 19.5 kR/A at 5200 A. The spectral distribution remained that of the day sky until the sun was more than 99.8% obscured. During totality, the shorter wavelengths were enhanced, indicating a shift to the blue in sky color. Comparisons with an independent measurement from an aircraft show that the intensity scale height of the secondary scattered component, predominating at totality, is significantly less than that of the day sky. The measurements are compared with the day and twilight sky. (Author)

AD-639 891 **Field 4A**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
ON THE OBSERVATION OF IONOSPHERIC EFFECTS DUE TO DUMPING OF TRAPPED PARTICLES.
Environmental research papers,
by G. J. Gassmann, and C. P. Pike Jr. Aug 66, 11p
AFCRL-ERP-221, AFCRL-66-583
Proj. AF-5631
Task 563114
Prepared in cooperation with Lowel Technological Inst. Research Foundation, Mass.
Availability: Published in Radiation Trapped in the Earth's Magnetic Field p378-85 1966.

Descriptors: (*Ionosphere, *Electron density), Van Allen radiation belt, Magnetic storms, Atmospheric sounding.

Energy considerations lead to the conclusion that the Van Allen belts feed sizable amounts of ionizing energy into the ionosphere by precipitation of particles. Most suspicious, although not clearly unique in importance, are the western slopes of the magnetic anomalies and their conjugate areas. A map of prospective dumping areas of electrons due to longitudinal drift is presented. The results from thirteen airborne measurements in an area conjugate to the suspected South Atlantic dumping area are presented. Vertical ionospheric recordings during a number of nights of magnetically quiet periods have been analyzed in search for local effects. Up to nine observations per location, obtained at various different local times, were averaged. The echo amplitudes show no locbl effect recognizable on top of the expected temporal fluctuations. A distinct local effect, however, in a large area centering 1000 km north of Puerto Rico and probably extending to the east consisted of low values of f max Es-f relative to those at other areas covered. (Author)

AD-639 898 **Field 4A, 4B**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
CORRELATION BETWEEN ATMOSPHERIC BACKSCATTERING AND METEOROLOGICAL VISUAL RANGE.
Environmental research papers,
by Robert W. Fenn. 26 Apr 65, 8p AFCRL-ERP-213, AFCRL-66-549
Proj. AF-7621
Task 762103
Availability: Published in Applied Optics v5 n2 p293-6 Feb 1966.

Descriptors: (*Atmosphere, Backscattering), (*Meteorological parameters, Visibility), Aerosols, Rayleigh scattering, Correlation techniques, Scattering.

On the basis of present knowledge of the distribution of natural haze particles in the atmosphere, the relation between backscatter intensity and the visual range, or the extinction coefficient, was analyzed. It can be shown that the various processes which cause the changes in visibility (increasing particle number, changes in particle size distribution, etc.) result in rather different backscatter conditions. Only by a combination of such processes is it possible to explain a relation between backscatter and extinction coefficient as it can be derived from experimental data. It therefore becomes clear that such a relation cannot be a unique one and that it will change from one situation to another. (Author)

AD-639 958 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
ROCKET-BORNE OZONESONDE,
by Jagir S. Randhawa. Jul 66, 23p
Proj. DA-1L013001A91A
ECOM-5064

Descriptors: (*Atmospheric sounding, *Ozone), Sounding rockets, Meteorological instruments, Measurement, Stratosphere, Telemeter systems.

A stratospheric ozonesonde was developed which utilizes the chemiluminescent principle for the measurement of ozone concentration after deployment from an Arcas rocket vehicle. A sample bottle empties as it is carried to low pressures of high altitudes and is ejected above the stratopause level. Flow into the bottle results from the differential pressure as the instrument descends on a drag parachute. Ozone in the environment flows over the detector and the photons produced by the destruction of ozone molecules on the chemiluminescent material are monitored by a photomultiplier tube. The output signal is transmitted on a carrier frequency of 1680 megacycles and received at the ground by AN/GMD-1 equipment. The instrument is calibrated with known concentrations of ozone and flow rate. Results of one firing are presented. (Author)

AD-639 961 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
THE RATIO OF THE EXCHANGE COEFFICIENTS FOR HEAT AND MOMENTUM IN A HOMOGENEOUS THERMALLY STRATIFIED ATMOSPHERE,
by Frank V. Hansen. Jun 66, 30p
Task IV014501B53A-10
ECOM-5059

Descriptors: (*Atmosphere, Boundary layer), Numerical methods and procedures, Stability, Heat, Momentum, Partial differential equations, Meteorology.

A hypothesis concerning the ratio of the exchange coefficients for heat and momentum is formulated. From the basic assumptions of the Monin-Obukhov similarity theory and the theory of free convection, it is shown that the ratio of the coefficients is a two-part function of the nondimensional logarithmic wind shear and the gradient Richardson number. Experimental data tend to corroborate the theoretical values derived in this study within the limits of experimental error. (Author)

AD-640 003 **Field 4A, 17H**
Not available from CFSTI.
Scripps Institution of Oceanography, La Jolla, Calif.
AERIAL MEASUREMENTS OF ATMOSPHERIC CLARITY AND SKY LUMINANCE NEAR ALAMOGORDO, NEW MEXICO,
by Seibert Q. Duntley, Almerian R. Boileau, and Rudolph W. Preisendorfer. 15 Nov 56, 55p
Contracts NObs-43356, NObs-50274
Chapt. 2: Image Transmission by the Troposphere I, prepared for presentation at the Congress of the International Commission of Optics (4th) Cambridge-Boston, Mass., March 28-Apr 3, 1956. Also appears in journal cited below.
Availability: Published in The Optical Society of America v47 n6 p499-506 Jun 1957.

Descriptors: (*Optical tracking, *Atmosphere), (*Sky brightness, New Mexico), Aircraft, Visibility.

Data on the clarity of the atmosphere as it affects the optical tracking of aerial objects were obtained in the free-flight corridor at Alamogordo, New Mexico, in October 1956 by means of a specially instrumented B-29 aircraft. This report contains these data together with examples illustrating their use and a discussion of those optical principles which govern apparent contrast and visual detectability. (Author)

AD-640 133 **Field 4A**
Not available from CFSTI.
Emmanuel Coll., Boston, Mass.
RESEARCH DIRECTED TOWARD COSMIC RAY DATA.
Final rept. Feb 64-Mar 66,
by M. Patricia Hagan. 15 Mar 66, 157p
Contract AF 19 (628)-3828
Proj. AF-8600
Tasks 860004, 860006
AFCRL-66-614
Availability: Published in Various Journals noted below.

Descriptors: (*Cosmic rays, *Particle trajectories), (*Upper atmosphere, Cosmic rays), Photographic emulsions, Scientific satellites, Charged particles, Sounding rockets, Nuclei, Protons, Van Allen radiation belt, Nuclear reactions.

Contents: Yagoda, H., K. Fukui, E. Holeman, K. Kristiansson, and B. Lindkvist, 1964, 'Rocket Observation of Slow Heavy Primary Nuclei at Kronogard, Sweden', Il Nuovo Cimento, 34, (4), 854-859; Filz, R. C., H. Yagoda, and E. Holeman, 1964, 'Observations of Trapped Protons in Emulsions Recovered from Satellite Orbits', Space Research IV, Proceedings of the Fourth International Space Science Symposium, Warsaw, Poland, P. Muller, ed., North Publishing Co., Amsterdam; Lim, Y. K., and K. Fukui, 1965, 'Satellite Observations of Low-Energy Primary Cosmic Ray Nuclei of Charges Z > or = 6', AFCRL, Physical Sciences Research Papers, No. 181, Office of Aerospace Research, USAF; Filz, R. C., and E. Holeman, 1965, 'Time and Altitude Dependence of 55-Mev Trapped Protons, August 1961 to June 1964', Journal of Geophysical Research v70, (23), 5807-5822; Lim, Y. K., and K. Fukui, 1966, 'Charge Determination by Thin-Down Track Width Measurements'; Lim, Y. K., and K. Fukui, 'Low Energy Primary Cosmic Ray Nuclei of Charges Z > or = 6'; Filz, R. C., 1966, 'Comparison of the Low Altitude Inner Zone Vehicles 55-Mev Trapped Proton Flux Measured in 1965 to 1961-1962 Measurements'; Fukui, K., 'A Study of Low Energy Heavy Cosmic Ray Nuclei by Slicing Emulsions'; Fukui, K., 'A Slicing Method for Side-Viewing Nuclear Phenomena in Emulsions'.

AD-640 265 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
U. S. SUPPLEMENTARY ATMOSPHERES.
Air Force surveys in geophysics,
by K. S. W. Champion. Aug 66, 34p AFCRL-AFSG-184, AFCRL-66-564
Proj. AF-6690
Task 669003
Pub. in Proceedings of the Air Force Science and Engineering Symposium, Brooks AFB, Texas, 12-14 Oct 1965.

Descriptors: (*Atmosphere models, Standards), (*Upper atmosphere, Atmosphere

models), Periodic variations, Gravity, Density, Atmospheric temperature.

A radical new set of model atmospheres was prepared which represent typical atmospheric conditions for summer and winter at various latitudes up to 60 deg and which above 120 km are also functions of time of day and solar flux. These atmospheres connect at 80 km with Cole and Kantor's winter atmospheres for 30, 45, and 60 deg latitude, with their tropical atmosphere for 15 deg latitude and with their summer atmospheres for 30, 45, and 60 deg latitude. The three winter atmospheres merge at a common point at 120 km, with a density 50 percent above U. S. Standard 1962. The three summer atmospheres, plus the tropical atmosphere, merge at 120 km, with a density 20 percent below the U. S. Standard. In addition, a mean atmosphere has been prepared between 80 and 120 km which, in effect, constitutes a revision of the Standard. This atmosphere represents an average over all conditions, but also can be used for spring and fall at latitudes of 30 deg and higher. Each atmosphere has been calculated with a value of the acceleration due to gravity appropriate to the latitude. Starting from the three common points at 120 km are three sets of atmospheres. Each set consists of a number of atmospheres corresponding to exospheric temperatures lying between 600 and 2100K. At the higher altitudes, the seasonal dependence disappears and the variation is diurnal and with solar flux. These atmospheres are calculated using the acceleration due to gravity for a latitude of 45 deg. (Author)

AD-640 330 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
ON THE DETERMINATION OF FINE SCALE IONOSPHERIC INHOMOGENEITIES BY MEANS OF A FARADAY ROTATION ANALYSIS OF ECHO II RADAR RETURNS.
Memorandum rept.,
by John M. Goodman. 19 Sep 66, 24p NRL-MR-1723
Proj. RF-001-02-41-4001

Descriptors: (*Ionosphere, Electron density), (*Magneto-optic effect, Ionosphere), Radar signals, Polarization, Signal-to-noise ratio, Communication satellites (Passive).

Identifiers: Echo.

Radar returns from Echo II satellite were obtained during a period of sunspot minimum at Randle Cliff (NRL-CBD). By means of a Faraday rotation analysis it was tentatively concluded that electron content inhomogeneities of a few percent exist over horizontal scales of between 8 and 24 kilometers. It was concluded that the accuracy of the technique which was employed to deduce the inhomogeneities could be improved by increasing the radar signal to noise ratio and by operating at a lower radar frequency - possibly in the HF range. (Author)

AD-640 343 **Field 4A**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
CONCERNING THE SIMILARITY THEORY OF A. S. MONIN AND A. M. OBUKHOV FOR THE TURBULENT STRUCTURE OF THE THERMALLY STRATIFIED SURFACE LAYER OF THE ATMOSPHERE,
by K. L. Calder. 16 Jun 65, 7p
Availability: Published in Quarterly Journal of the Royal Meteorological Society v92 n391 p141-6 Jan 1966.

Descriptors: (*Atmospheric motion, Theory), Turbulence, Equations of motion, Thermal properties.

The paper considers the theoretical basis of the Monin-Obukhov similarity theory for the turbulent, thermally stratified, surface layer of the atmosphere. It is shown that the classical form of the similarity theory cannot be applied legitimately to the variances of the horizontal components of the wind velocity fluctuation. This limitation of the theory has recently been suspected on the basis of observational data, although its theoretical demonstration emphasizes the need for caution when attempting to apply similarity theory to other characteristics of the surface layer turbulence that are currently of interest. (Author)

AD-640 438 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Ballistic Research Labs., Aberdeen Proving Ground, Md.
FIVE-INCH HARP TESTS AT BARBADOS, WEST INDIES JANUARY-FEBRUARY 1966.
Memorandum rept.,
by Eugene D. Boyer. Jul 66, 26p BRL-MR-1771
Proj. RDT/E-1A011001B021

Descriptors: (*Atmospheric sounding, *Rocket assisted projectiles), (*Wind, Upper atmosphere), West Indies, Installation, Probes, Sabot projectiles, Gun launched, Radar tracking, Parachute descents, Guns.

Identifiers: Harp.

The installation of a 5-inch HARP gun system at Barbados, West Indies, is presented. The system is employed to carry a low cost wind sensor to 200,000 feet altitude. (Author)

AD-640 470 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
Norwegian Inst. of Cosmic Physics, Univ. of Oslo.
APPEARANCE OF ENHANCED VLF-EMISSIONS ON 8 kc/s OBSERVED ALONG A N-S CHAIN OF STATIONS,
by L. Harang. 15 Jun 66, 25p Scientific-5
Contract AF 61 (052)-811
AFCRL-66-684
See also AD-628 281.

Descriptors: (*Atmospherics, Very low frequency), Norway, Magnetic storms, Electromagnetic waves, Propagation, Meteorological phenomena.

VLF-emissions on 8 kc/s have been recorded simultaneously along a chain of stations in N-S direction: Tromso, Lycksele, Oslo and Chambon la Foret, covering a latitude difference from 70 degrees to 48 degrees N. It is shown that the polar VLF-emissions recorded close to the auroral zone at Tromso during the night also can be traced on the records from Oslo with amplitudes of about 1/k00 - 1/500 of the Tromso amplitudes. A new type of VLF-emissions has been shown to appear at the stations Lycksele - Oslo, but not appearing at Tromso and Cambon la Foret. These low-latitude VLF-emissions appear during day time. There is thus a time difference of about 12 hours in the mean appearance of these two types of VLF-emissions. It is further pointed out that whereas the polar VLF-bursts appear during weak or moderate geomagnetic storms and in many cases a coincidence in details appears between the amplitudes of the VLF-bursts and the geomagnetic variations, the low-latitude emission appear in the day and start after the commencement of a great geomagnetic storm, usually 10-16 hours after the start. There are thus reasons to believe that the two types of VLF-emissions, the polar type recorded close to the auroral zone, and the low-latitude type recorded 5 degrees - 10 degrees to the south of the auroral zone are produced by different primary processes of excitation. (Author)

N66-27027 **Field 4A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A MEASUREMENT OF THE ULTRAVIOLET NIGHTGLOW SPECTRUM.
by J. P. Hennes. 1965, 19p NASA-TM-X-56822
Submitted For Publication

Descriptors: *Aerobee rocket, *Airglow, *Night sky, *Ultraviolet spectrum, Afterglow, Atmosphere, Band, Emission, Molecule, Night, Oxygen, Rocket, Sky, Sounding, Spectrography, Spectrum, Ultraviolet, Upper.

For abstract, see S 04 15.

N66-27030 **Field 4A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE EQUATORIAL GEOMAGNETIC ANOMALY AND ITS ASSOCIATED CURRENT SYSTEM.
by R. A. Goldberg. Jul 65, 23p NASA-TM-X-56736
Submitted For Publication

Descriptors: *Electron distribution, *Geomagnetic anomaly, *Ionosphere, Anomaly, Charge, Current, Distribution, Electric, Electron, F layer, Fluid, Geomagnetic, Mapping, State, Steady, System.

For abstract, see S 04 15.

N66-27056 **Field 4A**
CFSTI Prices HC$6.50 MF$3.00
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
ELECTRON DENSITIES AND SCALE HEIGHTS IN THE TOPSIDE IONOSPHERE - ALOUETTE I OBSERVATIONS IN MIDLATITUDES, SUMMER 1963, WINTER 1963 - 1964.
by L. Colin, M. J. Rycroft, and J. O. Thomas. 1966, 658p NASA-SP-3026

Descriptors: *Alouette i satellite, *Ionospheric electron density, *Scale height, *Upper ionosphere, Alouette project, Altitude, Computer, Data, Density, Digital, Diurnal, Electron, Electronic, Height, Ionogram, Ionosphere, Ionospheric, Latitude, Plasma, Reduction, Satellite, Scale, Sunspot, Topside, Upper, Variance.

For abstract, see S 04 15.

N66-27058 **Field 4A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
DETERMINATION OF MEAN ATMOSPHERIC DENSITIES DURING MINIMUM SOLAR ACTIVITY BY MEANS OF THE EXPLORER XIX SATELLITE.
by G. M. Keating, D. S. Mc dougal, J. A. Mullins, and E. J. Prior. Jun 66, 29p NASA-TN-D-3432

Descriptors: *Atmospheric density, *Energy distribution, *Explorer xix satellite, *Solar activity, Activity, Altitude, Atmosphere, Atmospheric, Density, Distribution, Energy, Equation, Exosphere, Explorer project, Iteration, Mean, Minimum, Model, Perigee, Radiation, Satellite, Solar.

For abstract, see S 04 15.

N66-27082 **Field 4A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Inst. For Space Studies, New York.
THE RESPONSE OF AN UNBOUNDED ATMOSPHERE TO POINT DISTURBANCES. II - IMPULSIVE DISTURBANCES.
by S. Kato. 1965, 21p NASA-TM-X-56782
Submitted For Publication

Descriptors: *Atmospheric circulation, *Group velocity, *Isothermal flow, *Wake, Acoustic, Atmospheric, Circulation, Distribution, Disturbance, Energy, Flow, Frequency, Front, Gravity, Group, Impulse, Isotherm, Kinetic, Point, Propagation, Response, Unbounded, Velocity, Wave.

For abstract, see S 04 15.

N66-27205 Field 4A
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
ON THE HARDNESS OF X-RAY EMISSION OF SOLAR FLARES.
O Zhestkosti Rentgenovskogo Izlucheniya Solnechnykh Vspyshek
by L. S. Levitskiy. 23 Nov 63, 10p NASA-TT-F-8643, ST-SP-10072
Transl. Into English From Izv. Krymsk. Astrofiz. Observ. (Moscow), V. 29, 1963 P 146-151

Descriptors: *Solar flare, *Sudden ionospheric disturbance (sid), *X-ray analysis, Chromospheric, Emission, Flare, Frequency, Hardness, Maximum, Radiation, Reflection, Sid, Solar, Wavelength.

For abstract, see S 04 15.

N66-27206 Field 4A
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
ON THE ACCOUNTING OF SATELLITE-BORNE RADIATION MEASUREMENTS IN A NONADIABATIC MODEL OF ATMOSPHERIC MOTIONS.
K Uchetu Rezul'tatov Radiatsionnykh Izmereniy So Sputnikov V Neadiabaticheskoy Model Atmosfernykh Dvizheniy
by B. E. Shneyerov, and M. E. Shvets. 22 Nov 63, 8p NASA-TT-F-8642, ST-AM-10070
Contract NAS5-2078
Transl. Into English From Dokl. Akad. Nauk Sssr, Geofiz. (Moscow), V. 152, No. 3, 21 Sep. 1963 P 598-601

Descriptors: *Heat flow, *Meteorological satellite, *Radiation measurement, Atmosphere, Equation, Flow, Heat, Measurement, Meteorology, Model, Motion, Nonadiabatic, Radiation, Satellite.

For abstract, see S 04 15.

N66-27213 Field 4A
CFSTI Prices HC$1.00 MF$0.50
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
RECOMBINATION IN THE NIGHTTIME F-REGION FROM INCOHERENT SCATTER MEASUREMENTS.
by D. Mc crory, and J. S. Nisbet. 1965, 15p NASA-CR-57303
Grant NSG-134-61
Presented At Nato Advanced Study Inst. On Electron Density Profiles In The Ionosphere And Exosphere, Finse, Norway Submitted For Publication

Descriptors: *F layer, *Ion density, *Recombination coefficient, Coefficient, Density, Electron, Ion, Ionogram, Night, Profile, Ratio, Recombination, Region, Scattering, Temperature.

For abstract, see S 04 15.

N66-27230 Field 4A
CFSTI Prices HC$6.00 MF$1.25
Flight Safety Foundation, Inc., New York.
CLEAR AIR TURBULENCE.
by M. G. Beard, H. T. Harrison, and P. Rosenberg. Dec 65, 236p NASA-CR-62028
Contract NSR-33-026-001

Descriptors: *Aircraft hazard, *Atmospheric turbulence, *Clear air turbulence, *Flight hazard, Air, Aircraft, Atmospheric, Bibliography, Clear, Detection, Device, Flight, Forecasting, Hazard, Meteorology, Project, Research, Safety, Turbulence.

For abstract, see S 04 15.

N66-27312 Field 4A
CFSTI Prices HC$4.00 MF$1.00
Geophysics Corp. Of America, Bedford, Mass.
IONOSPHERIC SIMULATOR SURVEY.
by A. E. Barrington, E. D. Schultz, A. Sharma, and J. O. Sullivan. May 66, 148p NASA-CR-482
Contract NAS12-11

Descriptors: *Atmospherics, *Ionospheric composition, *Simulation, Charge, Density, Flux, Gun, Ion, Ionospheric, Particle, Plasma, Solar, Ultraviolet, X-ray.

For abstract, see S 04 15.

N66-27944 Field 4A
CFSTI Prices HC$3.00 MF$0.75
Geophysics Corp. Of America, Bedford, Mass. Technology Div.
COMPENDIUM OF WIND DATA FROM THE VAPOR TRAIL TECHNIQUE.
by J. F. Bedinger. Mar 66, 89p NASA-CR-75649, GCA-66-7-N
Contract NASW-1083

Descriptors: *Rocket sounding, *Vapor, *Wind velocity measurement, Atmosphere, Direction, Earth, Measurement, Rocket, Sounding, Speed, Trail, Transport, Upper, Vector, Velocity, Wind.

For abstract, see S 04 15.

N66-27946 Field 4A
CFSTI Prices HC$3.00 MF$0.75
Massachusetts Inst. Of Tech., Cambridge. Center For Space Research.
EXPERIMENTS ON EKMAN LAYER INSTABILITY.
by P. R. Tatro. Apr 66, 95p NASA-CR-75606, CSR-T-66-2
Grant NSG-496

Descriptors: *Ekman layer, *Hot-wire anemometer, *Velocity measurement, Anemometer, Boundary, Fluctuation, Frequency, Hot wire, Instability, Layer, Mean, Measurement, Profile, Reynolds number, Velocity, Wave, Wavelength.

For abstract, see S 04 15.

N66-27955 Field 4A
CFSTI Prices HC$1.00 MF$0.50
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
INVESTIGATION OF WARM FOG PROPERTIES AND FOG MODIFICATION CONCEPTS QUARTERLY PROGRESS REPORT, PERIOD ENDING 15 MAY 1966.
by W. C. Kocmond. 1966, 13p NASA-CR-75518, CAL-RM-1788-P-12
Contract NASR-156

Descriptors: *Fog, *Seeding, *Weather condition, Apparatus, Charge, Coalescence, Condition, Control, Diagram, Drop, Formation, Hygroscopicity, Natural, Nucleus, Prevention, Radiation, Salt, Theory, Visibility, Weather.

For abstract, see S 04 15.

N66-28028 Field 4A
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PROBABILITIES OF ZERO WIND SHEAR PHENOMENA BASED ON RAWINSONDE DATA RECORDS.
by L. E. Truppi. 26 Apr 66, 32p NASA-TM-X-53452
NASA ORDER H-66040
Prepared Jointly With Weather Bureau

Descriptors: *Probability, *Rawinsonde measurement, *Wind shear, Altitude, Data, Depth, Measurement, Meteorology, Occurrence, Profile, Rawinsonde, Shear, Vector, Velocity, Wind.

For abstract, see S 04 15.

N66-28243 Field 4A, 4B
CFSTI Prices HC$2.00 MF$0.50
Institut Royal Meteorologique De Belgique, Brussels.
THE AEROLOGICAL STATION OF THE ROYAL METEOROLOGICAL INSTITUTE OF BELGIUM.
Het Aerologisch Station Van Het Koninklijk Meteorologisch Instituut Van Belgie
by A. G. Maenhout. 1965, 30p
In Dutch Its Publ. Ser. A, No. 54

Descriptors: *Aerology, *Electromagnetic wave, *Radar measurement, *Radio meteorology, *Sounding, *Wave propagation, Atmospheric, Electricity, Electromagnetic, Equipment, Measurement, Meteorology, Ozonometry, Precipitation, Propagation, Radar, Radio, Short, Troposphere, Wave, Wind.

For abstract, see S 04 15.

N66-29333 Field 4A
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
THE ELEVEN-YEAR VARIATION CYCLE OF THE BRIGHTNESS, FORM AND DIMENSIONS OF THE COUNTERGLOW.
by I. S. Astapovich. Dec 63, 4p NASA-TT-F-8721
Transl. Into English From Astron. Tsirkuliar Akad. Nauk Sssr (Kazan), V. 190, 1958 P 25-26

Descriptors: *Atmospherics, *Solar activity, Activity, Brightness, Cycle, Dimension, Ellipse, Form, Glow, Latitude, Light, Parallax, Solar, U.s.s.r., Variation, Year.

For abstract, see S 04 16.

N66-29347 Field 4A
CFSTI Prices HC$1.00 MF$0.50
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
ELECTRON TEMPERATURE AND DENSITY FLUCTUATIONS IN THE DAYTIME IONOSPHERE.
by J. Doupnik, and J. S. Nisbet. 1965, 17p NASA-CR-57304
Grant NSG-134-61
Presented At Nato Advanced Study Inst. On Electron Density Profiles In The Ionosphere And Exosphere, Finse, Norway Submitted For Publication

Descriptors: *Density measurement, *Electron temperature, *F layer, *Incoherent scattering, *Ionospheric electron density, Day, Density, Electron, Energy, Equilibrium, Fluctuation, Incoherent, Ionospheric, Measurement, Rate, Scattering, Temperature, Thermal, Transport.

For abstract, see S 04 16.

N66-29350 Field 4A
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
POSITIVE ION COMPOSITION IN THE MAGNETOIONOSPHERE OBTAINED FROM THE OGO-A SATELLITE.
by H. C. Brinton, C. R. Smith, and H. A. Taylor Jr. 29 Jun 65, 46p NASA-TM-X-56722
Submitted For Publication

Descriptors: *Helium, *Hydrogen ion, *Ionosphere, *Ogo-a, *Spectrometer, Altitude, Concentration, Density, Distribution, Hydrogen, Ion, Ion distribution, Ionization, Laboratory, Orbit, Positive, Satellite, Thermal.

For abstract, see S 04 16.

N66-29358 Field 4A
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
ON THE INTENSIFICATION OF THE EMISSION OF THE NIGHT GLOW IN ZODIACAL LIGHT.
Ob Usilenii Emissionnykh Liniy Svechiniya Nochnogo Neba V Zodiakal'nom Svete
by M. G. Karimov. Nov 63, 6p NASA-TT-F-8713
Transl. Into English From Izv. Astrofiz. Inst., Akad. Nauk Kaz. Ssr (Alma Ata), V. 5, No. 7, 1957 P 120-122

Descriptors: *Airglow, *Emission spectrum, *Night sky, *Zodiacal light, Absorption, Brightness, Emission, Intensification, Light, Line, Night, Optical, Prism, Sky, Spectrograph, Spectrum, System, Zodiac.

For abstract, see S 04 16.

N66-29424 Field 4A
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
ROLE AND SOURCE OF CORPUSCLES OBSERVED IN THE IONOSPHERE AND AURORAS.
Rol' I Istochnik Korpuskul, Nablyudayushchikhsya V Ionosfere I Polyarnykh Siyaniyakh
by G. S. Ivanov-kholodnyi. Dec 63, 31p NASA-TT-F-8719
Transl. Into English From Kosmicheskie Luchi (Moscow), No. 5, 1963 P 154-170

Descriptors: *Aurora, *Electron flux, *Energy spectrum, *Ionospheric propagation, *Particle acceleration, Acceleration, Corpuscular, Electron, Energy, Flare, Flux, Glow, Intensity, Ionosphere, Particle, Propagation, Solar, Spectrum.

For abstract, see S 04 16.

N66-29425 Field 4A
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
ON THE PECULIARITIES OF THE LONGITUDINAL DISTRIBUTION OF SOLAR ACTIVITY.
K Voprosu Ob Osobennostyakh Dolgotnogo Raspredeleniya Solnechnoy Aktivnosti
by YU. I. Vitinskiy. Dec 63, 20p NASA-TT-F-8722
Transl. Into English From Izv. Glavnoi Astron. Observ. V Pulkovo (Leningrad), V. 21, No. 4, 1960 P 96-105

Descriptors: *Distribution function, *Map, *Solar activity, *Synoptical measurement, Activity, Creep, Cycle, Distribution, Formation, Function, Isoline, Longitudinal, Measurement, Solar, Spot, Surface, Synoptic, Zone.

For abstract, see S 04 16.

N66-29427 Field 4A
CFSTI Prices HC$3.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
SPECTRAL, ELECTROPHOTOMETRIC, AND RADAR RESEARCHES OF AURORAE AND AIRGLOW.
Radiolokatsionnyye Issledovaniya Polyarnykh Siyaniy I Svecheniya Nochnogo Neba
Mar 62, 59p NASA-TT-F-8183
Transl. Into English From Statei (Moscow), No. 6, 1961 P 1-42

Descriptors: *Airglow, *Aurora, *Photoelectric photometry, *Radar observation, *Spectral analysis, Acquisition, Analysis, Brightness, Data, Disturbance, Emission, Hydrogen, Magnetic, Observation, Radar, Spectral, Spectrograph, Vibration.

For abstract, see S 04 16.

N66-29451 Field 4A
CFSTI Prices HC$2.00 MF$0.50
California Univ., La Jolla. Dept. Of Physics.
EXPERIMENTS IN X-RAY AND GAMMA-RAY ASTRONOMY.
by L. E. Peterson. 1965, 28p NASA-CR-64398
Contracts NAS5-3122, NAS5-3177
Presented At The Nasa- University Program Review Conference, Kansas City, Mo., 1-3 Mar. 1965

Descriptors: *Oso, *Radiation detector, *Radio astronomy, Astronomy, Balloon, Cosmic, Detection, Energy, Flux, Gamma, Isotropic, Observatory, Orbital, Photon, Program, Radiation, Radio, Satellite, Solar, University, X-ray.

For abstract, see S 04 16.

N66-29460 Field 4A
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A SEARCH FOR THE QUIET TIME SOLAR GAMMA RAYS FROM BALLOON ALTITUDES.
by K. J. Frost, L. E. Peterson, and E. D. Rothe. Jan 66, 38p NASA-TM-X-55450, X-614-66-21, REV.
Contracts NASW-56, NAS5-976
Submitted For Publication Prepared In Part At Minnesota Univ. And California Univ., La Jolla

Descriptors: *Balloon, *Gamma ray beam, *Solar flux, Beam, Chromosphere, Crab nebula, Detector, Flux, Gamma, Limit, Photosphere, Quiet, Ray, Solar, Sun, Time, Upper.

For abstract, see S 04 16.

N66-35682 Field 4A
CFSTI Prices HC$1.00 MF$0.50
Academy Of Sciences (Ussr), Moscow.
THE OUTER REGION OF THE EARTH'S IONOSPHERE (FROM 2000 TO 200,000 KM).
by V. V. Bezrukikh, and K. I. Gringauz. 1965, 12p P 177-184 Refs In Russian

Descriptors: *Electron distribution, *Interplanetary space, *Ionospheric ion density, *U.s.s.r. space program, Collector, Concentration, Data, Density, Distribution, Electron, Interplanetary, Ion, Ionosphere, Peripheral, Probe, Program, Radiation, Region, Space, Space probe, U.s.s.r..

For abstract, see S 04 21.

N66-35684 Field 4A, 19G
CFSTI Prices HC$1.00 MF$0.50
Academy Of Sciences (Ussr), Moscow.
RESULTS OF RESEARCH IN THE IONOSPHERE WITH THE AID OF ROCKETS AND SATELLITES IN 1960-1964.
by B. N. Gorozhankin, and V. A. Rudakov. 1964, 15p
In Russian Reprinted

Descriptors: *Electron density profile, *High altitude environment, *Ionospheric ion density, *Rocket sounding, *Scientific satellite, Density, Electron, Environment, Great britain, High altitude, Ion, Ionosphere, Japan, Launching, Probe, Profile, Radio, Reaction, Rocket, Satellite, Science, Sounding, Temperature, U.s.a., U.s.s.r., Wave.

For abstract, see S 04 21.

N66-35685 Field 4A
CFSTI Prices HC$1.00 MF$0.75
Aerospace Corp., El Segundo, Calif.
MODELS OF THE TRAPPED RADIATION ENVIRONMENT. VOLUME II - INNER AND OUTER ZONE ELECTRONS.
by A. B. Lucero, J. I. Vette, and J. A. Wright. 1966, 100p NASA-SP-3024
Contract AF 04/695/-469
Supported In Part By Nasa

Descriptors: *Graph, *Outer radiation belt, *Table, *Trapped particle, Belt, Distribution, Energy, Field, Geomagnetic, Inner, Integration, Orbital, Outer, Radiation, Spectrum, Trap.

For abstract, see S 04 21.

N66-35775 Field 4A
CFSTI Prices HC$2.00 MF$0.50
Chicago Univ., Ill. Enrico Fermi Inst. For Nuclear Studies.
SPATIAL DISTRIBUTION OF ENERGETIC ELECTRONS IN THE GEOMAGNETIC TAIL.
by T. Murayama. Jun 66, 41p NASA-CR-77630, EFINS-66-64
Grant NSG-179-61, Contract AF 19/628/-2473

Descriptors: *Electron energy, *Geomagnetic field, *Spatial distribution, Boundary, Dependence, Distribution, Electron, Energy, Field, Flux, Geomagnetic, Magnetosphere, Particle, Radial, Sheath, Spatial, Tail, Van allen belt.

For abstract, see S 04 21.

N66-35786 Field 4A
CFSTI Prices HC$1.00 MF$0.50
Smithsonian Astrophysical Observatory, Cambridge, Mass.
THE SHAPE AND LOCATION OF THE DIURNAL BULGE IN THE UPPER ATMOSPHERE.
by L. G. Jacchia, and J. Slowey. 1 Apr 66, 24p NASA-CR-77652, SAO SPECIAL REPT.-207
Grant NSG 87-60

Descriptors: *Atmospheric density, *Diurnal variation, *Upper atmosphere, Atmosphere, Balloon, Bulge, Density, Distribution, Diurnal, Drag, Location, Model, Satellite, Shape, Temperature, Upper, Variation.

For abstract, see S 04 21.

N66-35801 Field 4A
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
ON THE TOTAL AMOUNT OF NEUTRAL HYDROGEN IN THE UPPER ATMOSPHERE OF THE EARTH.
O Polnom Kolichestve Neytral'nogo Vodoroda V Verkhney Atmosfere Zemli
by V. G. Kurt. 5 Apr 66, 12p NASA-CR-77676, ST-AI-OA-10470
Contract NAS5-9299
Transl. Into English From Kosmich. Issled. (Moscow), V. 4, Issue 1 1966 P 111-115

Descriptors: *Gas density, *Hydrogen, *Upper atmosphere, Abundance, Albedo, Altitude, Atmosphere, Brightness, Density, Distribution, Earth, Emission, Gas, L-band, Neutral, Optical, Radiation, Scattering, Solar, Theory, Thickness, Total, Transfer, Upper.

For abstract, see S 04 21.

N66-35802 Field 4A
CFSTI Prices HC$2.00 MF$0.50
California Univ., La Jolla. Dept. Of Physics.
PROCESSES ACTING UPON OUTER ZONE ELECTRONS. I - ADIABATIC PERTURBATIONS.
by C. E. Mc ilwain. 1 Sep 66, 30p NASA-CR-77577, UCSD-SP-66-5
Grant NSG-538
Presented At Inter- Union Symp. On Solar-terrest. Phys., Belgrade, 1 Sep. 1966

Descriptors: *Betatron, *Electron flux, *Outer radiation belt, *Trapped particle, Acceleration, Adiabat, Belt, Electron, Energetic,

Field, Flux, Geomagnetic, Magnetic, Outer, Particle, Perturbation, Radiation, Trapping, Variation, Zone.

For abstract, see S 04 21.

N66-36068 **Field 4A**
CFSTI Prices HC$1.00 MF$0.50
Graduate Research Center Of The Southwest, Dallas, Tex.
INVESTIGATIONS INTO THE MECHANISM AND RATES OF ATMOSPHERIC MIXING IN THE LOWER THERMOSPHERE SEMIANNUAL STATUS REPORT.
15 Sep 66, 7p NASA-CR-77859
Contract NGR-44-004-026

Descriptors: *Atmospheric composition, *Eddy current, *Thermosphere, Argon, Atmospheric, Composition, Concentration, Current, Diffusion, Eddy, Gravity, Helium, Mixing, Turbulence, Wave.

For abstract, see S 04 21.

PB-170 899 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Smithsonian Astrophysical Observatory, Cambridge, Mass.
THE SHAPE AND LOCATION OF THE DIURNAL BULGE IN THE UPPER ATMOSPHERE.
Special rept. on Research in Space Science,
by L. G. Jacchia, and J. Slowey. 1 Apr 66, 28p 3-66-29, SAO-SR-207
Grant NsG-87-60

Descriptors: (*Upper atmosphere, Diurnal variations), Atmospheric temperature, Density, Satellites (Artificial), Balloons, Drag.

An analysis of the drag of the two balloon satellites in near-polar orbits launched in the course of the last 2 years (Explorers 19 and 24) has afforded the opportunity of our studying the distribution of density and temperature at high latitudes, and has led to strange results concerning the shape and behavior of the diurnal atmospheric bulge. The picture of a bulge in which temperature and density decrease nearly symmetrically in all directions from a location that follows the latitude migrations of the subsolar point would seem to need considerable revision, at least for heights above 500 km. It appears that the bulge is noticeably elongated in the north-south direction and that its center does not move much from the equator - a picture that is reminiscent of that of the ion density distributions in the F2 layer. Some possible implications are discussed, as well as sources of error that may have affected these results. (Author)

AD-639 960 **See Field 19D**

AD-640 247 **See Field 3B**

AD-640 326 **See Field 22A**

N66-28666 **See Field 20G**

4B. METEOROLOGY

AD-451 124 **Field 4B**
CFSTI Price: HC$5.00
Travelers Research Center, Inc., Hartford, Conn.
A STATISTICAL APPROACH TO 2-7-hr PREDICTION OF CEILING AND VISIBILITY, VOLUME II.
Technical rept.
Sep 64, 199p TR-2, 7411-118a
Contract Cwb-10704

Descriptors: (*Ceiling, Weather forecasting), (*Visibility, Weather forecasting), (*Data processing systems, Weather forecasting), Computers, Data, Weather stations, Statistical analysis, Illinois, California, Wind, Temperature, Humidity.

Identifiers: REEP.

The statistical forecast technique, Regression Estimation of Event Probabilities (REEP), was used to develop equations for predicting ceiling and visibility at Chicago and three West Coast stations for periods of 2, 3, 5, and 7 hours. One set of REEP equations is developed for each of 36 predictands. The sets were applied to an independent sample of 1460 cases for each predictand and the resulting forecasts were verified. (Author)

AD-457 278 **Field 4B**
CFSTI Price: HC$2.60
Royal Aircraft Establishment, Farnborough (England).
TERMINAL VELOCITIES OF WINDOW DIPOLES USED IN HIGH ALTITUDE WIND MEASUREMENTS,
by T. W. G. Dawson. Nov 64, 27p Technical rept. TR-64049
N65-23609

Descriptors: (*Wind, Measurement), (*Falling bodies, Velocity), Radar confusion reflectors, Theory, Low altitude, High altitude, Viscosity, Drag, Radar equipment, Corrections, Mathematical analysis, Equations, Meteorological instruments.

Various theoretical formulae for the rate-of-fall of window dipoles at altitudes up to 100 Km are shown to be in close agreement with the best available experimental data. At low altitudes velocity is determined mainly by conventional aerodynamic drag. At approximately 20 Km, Lamb's theory of viscous flow is required whilst at 50-70 Km, corrections must be applied for 'slip-flow'. Finally, above about 75 Km, 'free molecule flow' theory is needed to get good agreement with experiment. For the most accurate measurements of wind structure it is desirable to employ dipoles with the smallest possible terminal velocity. This means that the dipoles should have low density and the smallest possible thickness. (Author)

AD-639 896 **Field 4B**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
WIND CONDITIONS IN SITUATIONS OF PATTERNFORM AND NON-PATTERNFORM CUMULUS CONVECTION.
Environmental research papers,
by Vernon G. Plank. 21 Jun 65, 16p AFCRL-ERP-206, AFCRL-66-417
Proj. AF-8620
Task 862006
Availability: Published in Tellus v18 n1 p1-12 1966.

Descriptors: (*Wind, Cumulus clouds), (*Cumulus clouds, Convection (Atmospheric)), Florida.

Comparisons were made between the wind and wind shear profiles pertaining to patternform (clouds in rows) and non-patternform cumulus convection. No unique or consistent differences were found. The directional correspondence of the cumulus rows and wind was also investigated. The rows were found to be most frequently oriented about 3 deg. to the left of the surface wind and about 15 deg. to the left of the wind at the cloud base level. (Author)

AD-639 959 **Field 4B**
CFSTI Prices: HC$3.00 MF$0.75
Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
THE WIND REGIME IN THE FIRST 62 METERS OF THE ATMOSPHERE,
by Frank V. Hansen, and Virgil D. Lang. Jun 66, 81p
Task IV04501B-53A-10
ECOM-5058

Descriptors: (*Wind, Meteorological parameters), New Mexico, Terrain, Periodic variations, Statistical analysis, Graphics.

Wind regime data in the form of wind roses and frequency of occurrence for nine tower levels by the month and diurnal classification are presented. Results indicate that terrain features in the vicinity of the White Sands Meteorological Research Tower exhibit a modifying effect on the diurnal and seasonal wind regime. It was also found that seasonal variations were in the form of a three season regime system rather than the expected four. (Author)

AD-639 987 **Field 4B, 12A**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Dept. of Statistics.
AN EXPERIMENT IN NON-LINEAR PREDICTION.
Revised ed.,
by Richard H. Jones. 12 Jul 65, 8p
Contract AF 49 (638)-1302
Proj. AF-9749
Task 974902
AFOSR-66-0656
Revision of manuscript submitted 5 May 1965.
Availability: Published in Journal of Applied Meteorology v4 n6 p701-5 Dec 1965.

Descriptors: (*Statistical analysis, *Weather forecasting), Dynamics, Time, Series.

The role of statistics in numerical weather prediction should be to aid in the handling of random errors and disturbances. The actual prediction is a problem in dynamics. When the initial conditions are observed with error, there is information in the past forecasts which could increase the accuracy of the numerical predictions. The techniques of control theory provide an optimal method for combining past forecasts with current observations. This paper demonstrates the method on simulated non-linear time series. (Author)

AD-640 006 **Field 4B**
CFSTI Prices: HC$3.00 MF$0.75
Air Force Cambridge Research Lab., L. S. Hanscom Field, Mass.
MEAN MONTHLY 300 AND 200-MB CONTOURS AND 500, 300, AND 200-MB TEMPERATURES FOR THE NORTHERN HEMISPHERE.
Geophysical research papers,
by Eberhard W. Wahl. Apr 58, 88p AFCRL-GRP-57, AFCRL-TR-58-207

Descriptors: (*Atmospheric temperature, Northern hemisphere), Barometric pressure, Troposphere, Maps.

Mean monthly contour and temperature charts have been prepared from data compiled in the monthly publication 'Climatic Data of the World.' These charts are based upon a 6-year period (1950 thru 1955) and they represent features of the temperature at 500, 300, and 200 mb and pressure height distributions at 300 and 200 millibars. The construction of these charts is discussed briefly and some general remarks are made on the large-scale behavior of these data. (Author)

AD-640 029 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
Redstone Scientific Information Center, Redstone Arsenal, Ala.
AN EXPERIMENT OF THE QUANTITATIVE DESCRIPTION OF CLIMATIC ELEMENT FIELD BY ORTHOGONAL FUNCTIONS,
by Shih Yung-nien. 18 Jul 66, 23p RSIC-578
TT-66-62396
Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v35 n3 p343-51 1965

Descriptors: (*Climatology, Experimental data), Statistical analysis, China, Atmospheric temperature, Mathematical models.

The author first proposes the generalized problem of the quantitative description of climatic field by

means of approximate analytic expression. It is submitted that the application of the linear combination of orthogonal functions in approximate expression has many advantages. A formula to measure the precision of the calculation is also proposed. Two calculated examples are given. (Author)

AD-640 074 **Field 4B**
CFSTI Prices: HC$2.00 MF$0.50
Weather Wing (4th), Colorado Springs, Colo. Scientific Services Branch.
PERSISTENCE PROBABILITY.
Technical paper,
by Joe S. Restivo. Aug 66, 41p TP-66-1

Descriptors: (*Weather forecasting, *Probability), Tables, Visibility, Diurnal variations, Meteorology.

The paper consolidates many ideas--both published and suggested--concerning the use of persistence as a practical forecast tool. Specific emphasis is placed on the construction of ceiling and visibility persistence probability (or conditional probability) tables and suggested uses as a short-period forecast aid. The paper contains a survey of published literature available in the technical files of Headquarters, 4th Weather Wing and presents many ideas and suggestions for designing improved probability tables. (Author)

AD-640 132 **Field 4B**
Not available from CFSTI.
Woods Hole Oceanographic Institution, Mass.
HEAT FLUX AND SURFACE STRESS ON AND NEAR AN ISLAND IN THE TRADE WIND REGION.
Final rept. 5 Jun 62-30 Nov 65,
by E. B. Kraus. 30 Nov 65, 163p Rept. nos. 7, Ref-66-25
Contract DA-36-039-sc-90784 (E)
Proj. DA-1V0-14501-B-53A-09
See also AD-625 180.
Availability: Published in Various Journals.

Descriptors: (*Marine meteorology, *Tropical regions), Meteorological instruments, Transport properties, Statistical analysis, Perturbation theory.

The report covers work carried out over three years on topics in tropical meteorology and air-sea interaction. This included the development of a new type of wave sensor, and a new stable meteorological buoy as well as wind and temperature measuring devices and recording equipment. The properties of a special experimental field near Aruba, Netherlands Antilles, is described. A long appendix contains reprints of papers published by members of the group between 1962 and 1965. The papers are listed under subheadings: Instrumental Work, Coupled, horizontally homogeneous transfer processes, Statistical Studies, Numerical Studies, Studies of Perturbations. (Author)

AD-640 157 **Field 4B**
CFSTI Prices: HC$2.00 MF$0.50
Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
THE DESIRABILITY OF USING A FAST SAMPLING RATE FOR COMPUTING WIND VELOCITY FROM PILOT-BALLOON DATA.
by Henry Rachele, and Louis D. Duncan. Jul 66, 31p
Task 1V014501B53A-10
ECOM-5066

Descriptors: (*Wind, *Sampling), Velocity, Meteorological parameters, Meteorological balloons, Collecting methods, Errors.

Advantages of using a fast sampling rate for providing raw data for computing wind velocities from pilot-balloon observations are developed. Two independent approaches showed that (for a given sampling rate) the errors in the mean wind computed through a layer tend to be smaller the larger the layer. However, it is also shown that for a given layer (except for very thin layers), frequent observations through the layer will provide better wind estimates. In addition, graphs are presented which give estimates of relative wind errors as a function of sampling rate and true mean wind speed. (Author)

AD-640 216 **Field 4B, 2F, 13L**
CFSTI Prices: HC$2.00 MF$0.50
Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif.
SOME CHARACTERISTICS OF THE THREE-DIMENSIONAL STRUCTURE OF SANTA ANA WINDS.
Research paper,
by Michael A. Fosberg, Clyde A. O'Dell, and Mark J. Schroeder.1966, 44p RP-PSW-30
Contract OCD-PS-65-27
Task 2535A

Descriptors: (*Wind, Structural properties), Meteorology, Fire safety, Forest fires, Meteorological parameters, California.

Identifiers: Foehn winds.

The three-dimensional structure of the Santa Ana was investigated in two case studies. Incorporated into a descriptive model of the Santa Ana were: (a) a bispectral gravity wave flow with a lee trough, produced by conservation of potential vorticity having a wave length of the order of 300 km. and short waves 6 to 10 km. long; (b) intensity of the foehn related to the Montgomery stream function on an isentropic surface in the upper portion of the planetary boundary layer; and (c) foehn islands and foehn surfacing related to the long and short waves, respectively. (Author)

AD-640 282 **Field 4B**
CFSTI Prices: HC$2.00 MF$0.50
Atmospheric Research and Development Corp., Kansas City, Mo.
ESTIMATING THUNDERSTORM PENETRATIONS OF THE TROPOPAUSE,
by Michael J. Long. Jul 66, 32p Scientific-1
Contract AF 19 (628)-5189
Proj. AF-8624
Task 862401
AFCRL-66-556

Descriptors: (*Thunderstorms, *Tropopause), Meteorological radar, Penetration, Atmospheric sounding, Moisture, Energy, Weather stations.

Data sources for radar measurements of thunderstorm penetrations of the tropopause level outside the United States are listed, but large areas will not be covered in any event. Two studies suggest that the sole use of low level moisture or the maximum amount of energy available to a storm as determined from a sounding will not be successful in estimating the distribution of penetrations above the tropopause level. An equation of the form Y = Ae exp. - Bx was found to fit the cumulative distribution of penetrations of the tropopause level to a high degree at all the stations studied. A method of estimating the cumulative frequency of penetrations based on a determination of the highest penetration likely to occur and the equation mentioned above gave good results for two widely separated stations in the United States having different thunderstorm climatologies. (Author)

AD-640 375 **Field 4B, 1B**
CFSTI Prices: HC$4.00 MF$1.00
Royal Aircraft Establishment, Farnborough (England).
PROJECT TOPCAT: SUMMARY OF METEOROLOGICAL OBSERVATIONS AND AIRCRAFT MEASUREMENTS DURING ROUTINE FLIGHTS IN THE AUSTRALIAN JET STREAM.
Technical rept.,
by E. W. Wells. Apr 66, 103p TR-66122

Descriptors: (*Jet streams (Meteorology), Meteorological parameters), (*Clear air turbulence, *Australia), Flight paths, Wind, Atmospheric temperature, Meteorological instruments, Great Britain.

Identifiers: Topcat project.

A number of flights were made over set tracks and heights to measure clear air turbulence in the vicinity of the Flinders Ranges in South Australia. Details of the meteorological observations and flight paths, and measurements of wind, temperature and turbulence obtained from the aircraft instrumentation are presented. Wind and temperature gradients were derived for cross sections on the upwind and downwind sides of the Ranges and a comparison made of the intensity of turbulence between the two sides. (Author)

AD-640 384 **Field 4B, 6F**
CFSTI Prices: HC$1.00 MF$0.50
Cold Regions Research and Engineering Lab., Hanover, N. H.
EVALUATION OF AN ECONOMICAL INSTRUMENT SHELTER FOR MICROCLIMATOLOGICAL STUDIES.
Special rept.,
by T. C. Vogel, and P. L. Johnson. May 66, 7p
SR-84
Task 1V025001A13002

Descriptors: (*Climatology, Instrumentation), (*Meteorological instruments, *Shelters), Ecology, Effectiveness, Environmental tests, Arctic regions.

A number of inexpensive, lightweight instrument shelters capable of screening meteorological instruments in the field were required for an ecological research project in northern Alaska. Such a shelter had to be inexpensive, collapsible for shipment, easily assembled in the field, capable of housing recording instruments as large as a Friez hygrothermograph, and comparable to a standard U. S. Weather Bureau shelter or Stevenson screen in its ambinet thermal characteristics. These criteria were met by a design which was fabricated and successfully employed at six sites at Barrow, Alaska, during July and August 1964. (Author)

N66-27948 **Field 4B**
CFSTI Prices HC$4.00 MF$1.00
Aracon Geophysics Co., Concord, Mass.
ORBITAL AND METEOROLOGICAL FACTORS PERTINENT TO SATELLITE TRANSMISSIONS OF FACSIMILE WEATHER CHARTS FINAL REPORT.
by A. R. Hall, L. Novotny, R. R. Sabatini, and J. E. Sissala. Dec 65, 148p NASA-CR-75588
Contract NAS5-9664
Its Rept.-9g23-f

Descriptors: *Automatic picture transmission (apt), *Nimbus satellite, *Synchronous meteorological satellite (sms), *Weather chart, Automatic, Chart, Earth, Meteorology, Nimbus, Orbital, Picture, Satellite, Synchronous, Transmission, Weather.

For abstract, see S 04 15.

N66-27987 **Field 4B**
CFSTI Prices HC$1.00 MF$0.50
Genoa Univ. (Italy). Istituto Geofisico E Geodetico.
METEOROLOGICAL OBSERVATORIES ACTIVITY REPORT, THREE YEAR PERIOD, 1962-1963-1964.
Relazione Sull'attivita Svolta Nel Triennio, 1962-1963-1964
by M. Bossolasco. 1965, 14p
In Italian

Descriptors: *Geodesy, *Geophysics, *Research project, *University program, Activity, Aeronomy, Field, Geomagnetism, Gravimetry, Marine, Meteorology, Observatory,

Progress, Report, Research, Science, Seismology.

For abstract, see S 04 15.

N66-28002 **Field 4B**
CFSTI Prices HC$2.00 MF$0.50
Aeronautical Research Council (Gt. Brit.)
LOW ALTITUDE GUST MEASUREMENTS OVER THREE ROUTES IN THE U.K..
by E. W. Wells. 1965, 33p ARC-CP-676, RAE-TN-STRUCT-320

Descriptors: *Great britain, *Gust, *Low altitude, Air, Aircraft, Altitude, Current, Flight, Low, Meteorology, Terrain, Turbulence.

For abstract, see S 04 15.

N66-28238 **Field 4B**
CFSTI Prices HC$3.00 MF$0.75
Finnish Meteorological Office, Helsinki.
CLIMATOLOGICAL DATA, 1964.
1965, 100p
In Finnish And English Its Meteorol. Yearbook Of Finland, Vol. 64, Pt. 1a, 1964

Descriptors: *Climatology, *Finland, *Meteorology, *Table, Cloud, Cover, Data, Humidity, Precipitation, Pressure, Temperature, Visibility, Weather, Wind.

For abstract, see S 04 15.

N66-28385 **Field 4B**
CFSTI Prices HC$7.00 MF$1.75
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PERCENTAGE LEVELS OF WIND SPEED DIFFERENCES COMPUTED BY USING RAWINSONDE WIND PROFILE DATA FROM CAPE KENNEDY, FLORIDA.
by D. W. Camp, and M. Susko. 12 May 66, 320p NASA-TM-X-53461

Descriptors: *Rawinsonde measurement, *Upper atmosphere, *Wind velocity, Atmosphere, Cape kennedy, Data, Launch vehicle, Level, Measurement, Percentage, Profile, Rawinsonde, Speed, Table, Upper, Velocity, Wind.

For abstract, see S 04 15.

N66-29069 **Field 4B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TIROS VII INFRARED RADIATION COVERAGE OF THE 1963 ATLANTIC HURRICANE SEASON WITH SUPPORTING TELEVISION AND CONVENTIONAL METEOROLOGICAL DATA.
by L. J. Allison, and H. P. Thompson. Jun 66, 52p NASA-TN-D-3127

Descriptors: *Atlantic ocean, *Data analysis, *Hurricane, *Infrared radiation, *Tiros vii satellite, Analysis, Cloud, Cyclone, Data, Infrared, Radiation, Storm, Structure, Tiros project, Tiros satellite, Tropical.

For abstract, see S 04 16.

N66-29302 **Field 4B**
CFSTI Prices HC$2.00 MF$0.50
White Sands Missile Range, N. Mex. Atmospheric Science Lab.
AEROBEE NASA 4.51 UG (23 MAY 1966) METEROLOGICAL DATA REPORT.
by G. L. Dunaway. Jun 66, 32p NASA-CR-75855, DR-36
Jun. 1966 32 P Refs

Descriptors: *Aerobee rocket, *Ballistic missile, *Impact prediction, *Meteorology, *Sounding rocket, *Table, Ballistics, Data, Flight, Impact, Missile, Prediction, Rocket, Sounding, Tabulation.

For abstract, see S 04 16.

N66-29367 **Field 4B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
FLIGHT-TEST RESULTS OF GAMMA RAY SCATTERING AS A TECHNIQUE FOR AIR-DENSITY MEASUREMENT.
by H. G. Reichle Jr. 1965, 11p NASA-TM-X-56837
Presented At The 2d Conf. On Direct Aeronomic Meas. In The Lower Ionosphere, Ill. Univ., Urbana, 27-30 Sep. 1965

Descriptors: *Atmospheric density, *Flight test, *Gamma radiation, *Payload, *Scintillation counter, Air, Altitude, Atmospheric, Counter, Data, Density, Field, Flight, Flow, Gamma, Measurement, Photon, Radiation, Scattering, Scintillation, Technique, Test.

For abstract, see S 04 16.

N66-29742 **Field 4B**
CFSTI Prices HC$2.00 MF$0.50
Rand Corp., Santa Monica, Calif.
PROBABILISTIC DYNAMICS OF A GLOBAL HORIZONTAL SOUNDING SYSTEM.
by R. R. Rapp. Jun 66, 36p NASA-CR-76000, RM-5018-NASA
Contract NASR-21/07/

Descriptors: *Atmospheric circulation, *Balloon sounding, *Positioning, *Probability, Atmospheric, Balloon, Circulation, Distribution, Method, Model, Motion, Optimization, Sounding, Trajectory, Transition.

For abstract, see S 04 16.

N66-29745 **Field 4B**
CFSTI Prices HC$2.00 MF$0.50
White Sands Missile Range, N. Mex. Atmospheric Sciences Lab.
AEROBEE NASA 4.92 (20 MAY 1966) METEOROLOGICAL DATA REPORT.
by G. L. Dunaway. Jun 66, 34p NASA-CR-76049, DR-35
Jun. 1966 34 P Refs

Descriptors: *Aerobee rocket, *Ballistic trajectory, *Meteorology, *Sounding rocket, Atmosphere, Ballistics, Data, Impact, Missile, Parameter, Prediction, Rocket, Sounding, Table, Trajectory, Upper, Velocity, Wind.

For abstract, see S 04 16.

N66-29977 **Field 4B**
CFSTI Prices HC$5.00 MF$1.25
Stanford Research Inst., Menlo Park, Calif.
PERFORMANCE SPECIFICATIONS FOR A METEOROLOGICAL SATELLITE LIDAR FINAL REPORT.
by W. E. Evans, M. G. Ligda, W. Viezee, and E. J. Wiegman. Jun 66, 190p NASA-CR-76087
Contract NASR-49/22/

Descriptors: *Cloud cover, *Lidar, *Meteorological satellite, Backscatter, Cirrus, Cloud, Cover, Density, Design, Detection, Height, Laser, Light, Meteorology, Performance, Radar, Ranging, Satellite, Specification.

For abstract, see S 04 16.

N66-35674 **Field 4B**
CFSTI Prices HC$4.00 MF$1.00
Institut Royal Meteorologique De Belgique, Brussels.
CLIMATOLOGIC OUTLINE OF THE KING BADOUIN BASE IN ANTARCTICA.
Esquisse Climatologique De La Base Roi Baudouin En Antarctique
by F. E. Bastin. 1966, 116p
In French Its Publ. Ser. A, No. 56

Descriptors: *Antarctica, *Climatology, *Meteorology, *Weather chart, Chart, Cloud, Extreme, Fog, Observation, Polar, Precipitation, Region, Sky, Snow, Temperature, Velocity, Weather, Wind.

For abstract, see S 04 21.

N66-35780 **Field 4B**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
DETERMINATION OF BOUNDARIES OF CLOUDINESS.
Ob Opredelenii Granits Oblachnosti
by I. A. Kibel. 27 Aug 65, 12p NASA-CR-77704, ST-AM-10376
Contract NAS5-3760
Transl. Into English From Dokl. Akad. Nauk Sssr, Ser. Geofiz. (Moscow), V. 160, No. 4, 1965 P 815-818

Descriptors: *Adiabatic equation, *Boundary value problem, *Cloud cover, *Hydrodynamics, Adiabat, Boundary, Cloud, Cover, Crest, Equation, Flow, Forecasting, Motion, Problem, Value, Weather.

For abstract, see S 04 21.

N66-36167 **Field 4B**
CFSTI Prices HC$4.00 MF$0.75
Institut Royal Meteorologique De Belgique, Brussels.
THE 1959 BELGIAN ANTARCTIC EXPEDITION - METEOROLOGICAL SURFACE OBSERVATIONS.
Expedition Antarctique Belge 1959. Observations Meteorologiques En Surface
by F. E. Bastin. 1966, 111p
In French Its Publ. Ser. A, No. 57

Descriptors: *Antarctica, *Meteorology, *Weather forecasting, Analysis, Atmospheric, Barometer, Calculation, Card, Cloud, Forecasting, Horizon, Instrumentation, Latitude, Longitude, Observation, Pressure, Punch, Region, Surface, Table, Velocity, Visibility, Weather, Wind.

For abstract, see S 04 21.

N66-36367 **Field 4B**
CFSTI Prices HC$3.00 MF$0.75
Ludwig-maximilians-universitat, Munich (West Germany).
TROPOSPHERIC WATER VAPOR CONTENT AND SURFACE TEMPERATURES FROM TIROS IV RADIATION DATA.
by E. Raschke. Sep 66, 114p NASA-CR-595
Grant NSG-305

Descriptors: *Surface temperature, *Thermal radiation, *Tiros iv satellite, *Water vapor, Accuracy, Content, Data, Degradation, Humidity, Map, Radiation, Surface, Temperature, Thermal, Troposphere, Vapor, Water.

For abstract, see S 04 21.

PB-173 014 **Field 4B**
CFSTI Prices: HC$2.00 MF$0.50
Satellite and Mesometeorology Research Project, Univ. of Chicago, Ill.
SOME EFFECTS OF LAKE MICHIGAN UPON SQUALL LINES AND SUMMERTIME CONVECTION.
Research paper..
by Walter A. Lyons. May 66, 27p SMRP-RP-57
Grant Cwb-WBG-34

Descriptors: (*Convection (Atmospheric), Great Lakes), (*Great Lakes, Meteorological parameters), Thunderstorms, Temperature, Wind, Cumulus clouds.

Identifiers: Lake Michigan.

There has recently been much discussion of whether, and to what extent, the cold water temperatures of Lake Michigan may decrease summertime rainfall. In an effort to specify one of the mechanisms by which a decrease may occur, a precise mesonanalysis, using all available surface and radar data, was made. The occlusion of the mesoscale cold front of an intense squall line mesosystem with a well-developed lake breeze front resulted initially in severe thunderstorms forming at the point of intersection of the two mesoscale fronts, as it propagated southward at 65 kt. However, this was followed by the rapid and total dissipation of those cells in the line which intersected the lake shore. This was due to the marked stabilizing effect of cool lake air injected into the leading edge of the line by the undercutting mesoscale cold front which continued to move out over the lake. No cell penetrated more than 20 miles offshore. (Author)

PB-173 088 **Field 4B**
CFSTI Prices: HC$7.00 MF$1.75
Texas A and M Univ., College Station. Dept. of Meteorology.
A BIBLIOGRAPHY OF MESO--AND MICRO--ENVIRONMENTAL INSTRUMENTATION.
Environmental data service rept.,
by John F. Griffiths, and M. Joan Griffiths. Jul 66, 360p
WBTN-43-EDS-2

Descriptors: (*Meteorological instruments, Micrometeorology), (*Micrometeorology, Bibliographies), Atmospheric condensation, Air pollution, Evaporation, Atmospheric condensation, Atmospheric precipitation, Barometric pressure, Meteorological phenomena, Temperature, Radiation monitors, Moisture, Soils.

Identifiers: ESSA.

In the past, the meteorologist has been generally concerned with the gross features of the atmosphere, measured with instruments of relatively coarse sensitivity. Today, and in the future, the environmental scientist is and will be concerned with measurements of the meso- and micro-environment. Since it will often be impossible to use standard meteorological instruments, he will either have to modify commercially available apparatus. This bibliography was prepared in anticipation of these needs and is intended to guide the researcher to pertinent subject references.

PB-173 125 **Field 4B, 1B**
CFSTI Prices: HC$5.60 MF$0.50
Lightning and Transients Research Inst., Minneapolis, Minn.
EXPERIMENTAL TRIGGERING OF NATURAL LIGHTNING (IN RELATION TO EFFECTS ON NEAR-BY AIRCRAFT).
Technical rept.,
by J. R. Stahmann. Mar 66, 56p
Contract FA65WA-1277
FAA-ADS-72

Descriptors: (*Lightning, Airplanes), (*Thunderstorms, Airplanes), Discharges (Electrical), Hazards.

Identifiers: F-100.

Natural lightning was triggered by directing rockets, trailing thin stainless steel wire, from the Research Vessel Thunderbolt toward charged clouds. One objective was to attempt to trigger the strokes through an F-100 jet flying over the ship. The F-100 carried many recording instruments to measure the effects and characteristics of both direct and nearby lightning strokes. Measurement equipment was also provided on the ship to obtain coordinated stroke characteristics at the sea level stroke termination point. These data are important for lightning protection of aircraft studies, particularly around fuel vent areas. Data concerning current waveform, blast pressure waves and plasma extent were obtained. It was shown that strokes can be triggered about 50% of the time in medium to high electric fields. (Author)

PB-173 197 **Field 4B**
CFSTI Prices: HC$3.60 MF$0.50
Chicago Univ., Ill. Cloud Physics Lab.
CLOUD PHYSICS: PROBLEMS ASSOCIATED WITH ICE NUCLEATION AND PRECIPITATION DEVELOPMENT.
Rept. for Apr 65-Apr 66,
by Roscoe R. Braham Jr. Jun 66, 39p
Grant NSF-GP-3881

Descriptors: (*Clouds, *Meteorological parameters), (*Ice, Electrical properties), (*Water, Physical properties), (*Cloud chambers, Nucleation), Supercooling, Meteorological instruments, Thermoelectricity, Atmospheric precipitation.

Contents: Intra-cloud variations in meteorological variables; electrical properties of ice; structure of liquid water and its effect upon the homogeneous nucleation of supercooled drops; cloud chamber for the study of artificial ice nucleants.

AD-477 977 **See Field 1B**

AD-477 988 **See Field 1B**

AD-639 898 **See Field 4A**

AD-640 016 **See Field 15B**

AD-640 252 **See Field 14B**

N66-28243 **See Field 4A**

PB-173 015 **See Field 8H**

PB-173 200 **See Field 20F**

5A. ADMINISTRATION AND MANAGEMENT

AD-639 923 **Field 5A**
Not available from CFSTI.
Office of Naval Research, Washington, D. C.
RESEARCH PROGRAM EFFECTIVENESS,
by Dorothy M. Gilford, and Marshall C. Yovits. Dec 65, 558p
Proceedings of Conference sponsored by ONR, Washington, D. C. Jul 27-29 1965.
Availability: Hard copy available from Gordon and Breach, Science Pub., Inc., 150 Fifth Ave., New York, N. Y. $29.50, reference ed., $10.00, professional ed.

Descriptors: (*Symposia, *Research program administration), (*Management engineering, Research program administration), Effectiveness, Cost effectiveness, Industrial research, Decision making, State-of-the-art reviews, Procurement, Information theory, Quality control, Mathematical models, Scheduling, Scientific research, Social sciences.

This volume comprises the proceedings of the 1965 Conference on Research Program Effectiveness. The theme of this conference was 'Contributions of Research to the Improvement of Research Planning, Evaluation, and Utilization.' The central objective was to identify high-priority opportunities for advancing the theory and practice of research program management through the application of scientific methods. Papers reported on current data and concepts in research on R and D management with implications for enhancing the effectiveness of research programs and their management. Although the main focus was on studies of research, the conference proceedings include papers on development and engineering as well. Scientific analysis of problems which ordinarily occupy science administrators of broad research programs at various levels of management in large organizations was emphasized. (Author)

AD-640 147 **Field 5A**
Not available from CFSTI.
American Society for Quality Control, Inc., Milwaukee, Wis.
WEST COAST CONFIGURATION MANAGEMENT SYMPOSIUM. TECHNICAL PAPERS, VOLUME I.
Technical conference no. 1.
1965, 166p
Proceedings of Conference held at the Disneyland Hotel in Ahaheim, California, Aug 19-20, 1965.
Availability: American Society for Quality Control, Inc., 161 West Wisconsin Ave., Milwaukee, Wis. 53202 HC$15.00.

Descriptors: (*Symposia, *Management engineering), Configuration, Reports, Quality control, Systems engineering.

Contents: The challenge of configuration management, organization for configuration management, systems management as a means to program management, configuration control at launch site, Minuteman configuration acct'g., machine systems for control of contract reports, configuration management-Gemini and Titan, configuration management impact on functional departments, contracting to baseline, compliance by a major supplier with configuration management requirements of more than one customer, traceability and configuration data system, configuration management from the customers viewpoint, configuration management Lockheed space systems division, progressive 'fact', configuration control on spacecraft.

AD-640 207 **Field 5A, 12B**
CFSTI Prices: HC$1.00 MF$0.50
Federal Aviation Agency, Washington, D. C.
PERT (PROGRAM EVALUATION AND REVIEW TECHNIQUE): SELECTED REFERENCES.
May 62, 6p Bibliographic List-4

Descriptors: (*Bibliographies, *Management engineering), Effectiveness, Operations research.

Identifiers: PERT.

AD-640 233 **Field 5A, 12B**
CFSTI Prices: HC$1.00 MF$0.50
Federal Aviation Agency, Washington, D. C.
CENTRALIZED AND DECENTRALIZED MANAGEMENT: A SELECTED LIST OF REFERENCES.
Oct 62, 10p Bibliographic List-7

Descriptors: (*Bibliographies, *Management engineering), Industrial relations, Operations research.

AD-640 442 **Field 5A, 5D**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
RESOURCE LIMITS, POLITICAL AND MILITARY RISK TAKING AND THE GENERATION OF MILITARY REQUIREMENTS,
by Paul Y. Hammond. Sep 66, 47p P-3421-1

Descriptors: (*Military requirements, *Political science), Uncertainty, Research program administration, Management planning, Department of Defense.

AD-640 485 **Field 5A, 11F, 7D**
CFSTI Prices: HC$3.00 MF$0.75
Chicago Univ., Ill. Inst. for the Study of Metals.
EXPANDED RESEARCH PROGRAM IN MATERIALS SCIENCES.
Annual technical rept. no. 5, 1 Jul 65-30 Jun 66.
26 Jul 66, 100p
Contract SD-89

Descriptors: (*Materials, Scientific research), Research program administration, Chemistry, Physics, Geophysics, Metals, Nuclear physics.

Identifiers: ARPA.

The report lists all research in the field of materials science and includes pertinent administrative data within the following divisions: the Department of Chemistry, the Department of Geophysical Sciences, the Department of Physics, the Institute for the Study of Metals, and the Enrico Fermi Institute for Nuclear Studies.

N66-29571 **Field 5A**
CFSTI Prices HC$2.00 MF$0.50
George Washington Univ., Washington, D. C. Program Of Policy Studies.
PLANNING, PROGRAMMING AND BUDGETING - A TECHNIQUE FOR FEDERAL PROGRAM PLANNING AND DECISION-MAKING.
by R. G. Smith. 24 Nov 65, 32p NASA-CR-75897
Grant NSG-727

Descriptors: *Decision making, *Management planning, *United states, Budget, Decision, Defense, Department, Government, Management, Personnel, Planning, Programming, Reaction, System.

For abstract, see S 04 16.

N66-29744 **Field 5A**
CFSTI Prices HC$4.00 MF$1.00
Congress. Senate. Committee On Aeronautical And Space Sciences.
NASA AUTHORIZATION FOR FISCAL YEAR 1967.
1966, 143p
Report Of Comm. On Aeron. And Space Sci. On Hr 14324, 89th Congr., 2d Sess.

Descriptors: *Aeronautics, *Budget, *Nasa program, *Space science, Administration, Congress, Construction, Development, Facility, Operation, Research, Science, Space.

For abstract, see S 04 16.

N66-35974 **Field 5A**
CFSTI Prices HC$1.00 MF$0.50
George Washington Univ., Washington, D. C.
PRODUCTIVITY OF FEDERALLY FINANCED RESEARCH AND DEVELOPMENT FINAL REPORT, MAY 15, 1963 - MAY 14, 1966.
by D. S. Watson. 1966, 12p NASA-CR-77776
Grant NSG-425

Descriptors: *Economics, *Nasa program, *Patent, *Research project, Concentration, Contractor, Development, Finance, Government, Industry, Policy, Project, Research, U.s.a..

For abstract, see S 04 21.

N66-36388 **Field 5A**
CFSTI Prices HC$6.00 MF$1.25
George Washington Univ., Washington, D. C. Dept. Of Economics.
AN EVALUATION OF THE PATENT POLICIES OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION FINAL REPORT.
by D. E. Aaronson, M. A. Holman, and D. S. Watson. 31 Aug 66, 221p NASA-CR-77945
Grant NSG-425

Descriptors: *Nasa program, *Patent, Economics, Invention, Mission, Policy, Protection, Technology, Transfer, Utilization.

For abstract, see S 04 21.

PB-170 730 **Field 5A**
CFSTI Prices: HC$3.60
RAND Corp., Santa Monica, Calif.
THE DECISION-MAKING PROBLEM IN DEVELOPMENT,
by Burton H. Klein. 19 Feb 60, 32p P-1916
AD-224 166

Descriptors: (*Decision making, *Armed forces research), Military strategy, Production.

The purpose of the paper is to point out in what key respects the decision-making problem in development -- in kinds of development involving the rather ambitious advances that military development projects typically do involve -- is different from that in making production decisions.

PB-170 907 **Field 5A**
CFSTI Prices: HC$9.60 MF$0.75
Institute for Technical Documentation, Bucharest (Rumania).
ABSTRACTS OF RUMANIAN TECHNICAL LITERATURE, VOL. 1, NO. 4, OCTOBER-DECEMBER 1965.
1965, 94p

Descriptors: (*Scientific research, Bibliographies), Abstracts, Rumania, Mining engineering, Oils, Gasoline, Metallurgy, Mechanical engineering, Power, Electrical engineering, Electronics, Communication systems, Construction, Chemistry, Plastics, Fibers, Rubber, Pharmacology, Paper, Agriculture, Animals, Forestry, Wood, Textile industry, Leather, Glass, Food, Transportation, Traffic.

Contents: Technical works of general interest, Mining, Oil and gas industries, Metallurgy, Mechanical engineering, Energetics, Electrical engineering, Electronics, Telecommunication, Construction, Chemistry and chemical technology, Plastics, artificial and synthetic fibres, rubber, Pharmaceutical products, Pulp and paper, Agriculture, Stockbreeding, Forestry, Wood industry, Textile industry, Leather industry, Glass industry, Food industries, Transport and traffic routes.

PB-173 019 **Field 5A, 5C**
CFSTI Prices: HC$16.50 MF$1.00
Stanford Univ., Calif. Graduate School of Business.
OPTIMAL CAPACITY EXPANSION.
Technical rept.,
by Richard J. Giglio. Aug 66, 169p TR-16
Grant NSF-GS-552

Descriptors: (*Production, Optimization), Mathematical models, Optimization, Management planning, Costs, Probability, Stochastic processes.

The paper presents a number of mathematical models and results to aid in the determination of the amount and timing of capacity expansions. The term 'capacity' is used in the broad sense as the maximum rate at which any facility can produce salable output and it has the following characteristics: (1) Capacity is not continuously adjustable. That is, in general it is impossible, or at least undesirable, to expand or contract capacity in a one to one correspondence with a time varying demand. This can be for any of several reasons such as economies of scale, technological limitations, indivisibilities, and timing considerations. (2) Capacity expansions are not completely reversible. Once capacity has been installed the capital expenditures cannot be recovered fully by removing it. Several types of models are constructed for the purpose of exploring two broad facets of capacity planning: the dynamic facet and the stochastic facet.

PB-173 207 **Field 5A, 5I, 5C, 12B**
CFSTI Prices: HC$5.60 MF$0.75
Stanford Univ., Calif. Graduate School of Business.
A THEORY OF OPTIMAL PRODUCTION SCHEDULING AND EMPLOYMENT SMOOTHING,
by Steve A. Lippman, Alan J. Rolfe, Harvey M. Wagner, and John S. C. Yuan. Aug 66, 60p
Technical rept., TR-18
Grant NSF-GS-552

Descriptors: (*Production, Scheduling), (*Employment, *Management engineering), Optimization, Costs, Mathematical models.

PB-173 208 **Field 5A, 5I, 5C, 12B**
CFSTI Prices: HC$6.60 MF$0.75
Stanford Univ., Calif. Graduate School of Business.
ALGORITHMS FOR OPTIMAL PRODUCTION SCHEDULING AND EMPLOYMENT SMOOTHING,
by Steve A. Lippman, Alan J. Rolfe, Harvey M. Wagner, and John S. C. Yuan. Aug 66, 69p
Technical rept., TR-19 (Suppl.)
Grant NSF-GS-552

Descriptors: (*Production, Scheduling), (*Employment, *Management engineering), Optimization, Linear programming, Costs.

PB-173 263 **Field 5A**
CFSTI Prices: HC$6.00 MF$1.25
Booz, Allen and Hamilton, Inc., Chicago, Ill.
FEASIBILITY STUDY ON THE CREATION OF A RESEARCH CENTER IN THE DETROIT REGION,
Jul 65, 179p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Scientific research, *Michigan), Feasibility studies, Urban areas, Economics, Employment, Research program administration, Industries, Laboratories.

Identifiers: Detroit.

This study was undertaken to determine whether it was feasible to embark on an effort to establish a research center for the further attraction and advancement of research activity in the Detroit region and, if so, to develop a plan and program to bring it about. The fundamental goal to be reached through such a program would be the enhancement of the area's economic development through additional employment. The City of Detroit has developed an overall economic development plan as part of a concerted effort to build new sources of jobs, stabilize levels of employment, and diversify its economy. By way of implementation, approximately 66 acres, identified by the title 'Research Park West,' are being condemned and are to be cleared. Several hundred additional acres appear to be available in the same area for later expansion. However, making available a piece of land and designating it as a research park only establishes a location. This study is directed toward determining what needs to be done to create a research park which, in a real sense, is an active, going research activity. This summary states the pertinent findings and conclusions, and outlines an action program which, if successfully carried out, should result in making Research Park West truly a research activity. Five categories of research which should be emphasized are: Biomedical engineering; information retrieval research; polymer materials research; materials forming, fabricating and conversion research; and product and process control research.

AD-639 674 **See Field 14A**

AD-639 720 **See Field 12B**

AD-640 005 **See Field 5I**

AD-640 173 **See Field 5C**

AD-640 240 **See Field 1B**

AD-640 370 **See Field 11F**

AD-640 371 **See Field 11F**

5B. DOCUMENTATION AND INFORMATION TECHNOLOGY

AD-469 269 **Field 5B, 14D**
CFSTI Prices: HC$5.00 MF$1.00
Auerbach Corp., Philadelphia, Pa.
DESIGN OF RELIABILITY CENTRAL DATA MANAGEMENT SUBSYSTEM.
Final rept.,
by J. Sable. Jul 65, 162p
Contract AF 30(602)-3433
RADC-TR-65-189-Vol-2
See also AD-620 025.

Descriptors: (*Reliability (Electronics), *Information retrieval), (*Data processing systems, Systems engineering), Automatic, Machine translation, Indexing, Data storage systems, Reliability, Programming (Computers), Directories, Computer logic, Input-output devices.

Identifiers: File structures.

The report discusses the design of a file structure and an information storage and retrieval system for the planned U. S. Air Force Reliability Central. Volume II compares the design of the Reliability Central Data Management Subsystem (RCDMS) with other major data management systems in existence or currently under development. (Author)

AD-481 646 **Field 5B**
CFSTI Prices: HC$4.00 MF$0.75
Lockheed Missiles and Space Co., Sunnyvale, Calif.
INFORMATION ANALYSIS USING CHART VERSIONS 3 AND 5,
by L. W. Heinle. Apr 66, 104p LMSC-669737

Descriptors: (*Information retrieval, *Programming (Computers)), Data processing systems, Pattern recognition, Information theory, Data storage systems, Classification, Decision making, Standards, Analysis, Selection, Reliability, Statistical analysis, Graphics, Management planning.

A general information concept is presented to demonstrate the similarity of problems in the management of both scientific and technical information. The use of computer and graphic display for processing and formatting engineering design, manufacturing, financial, technical and scientific data is considered in depth. No programming experience is assumed although access to computer facilities usual in aerospace facilities is required to implement the nine types of chart paper including log-log, probability, Weibull together with other formats useful in information analysis for pattern recognition or frequency distributions. The programs are general in nature and are not keyed to any system in producing output information for control, tracking or diagnosis. (Author)

AD-639 624 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
Redstone Scientific Information Center, Redstone Arsenal, Ala.
CONVERTING THE IDEP MASTER FILE REPORTS FORMAT,
by Claude E. Martin. 6 Jun 66, 18p RSIC-567

Descriptors: (*Data processing systems, Information retrieval), (*Microfiche, Data processing systems), (*Microfilm, Data processing systems), Data storage systems, Preparation.

The report presents some of the problems that were encountered in converting the Interservice Data Exchange Program master film strip file to 16 mm roll film, and offers methods for solving them. It points out the lack of equipment and quality control techniques for producing film copies from hard copy documents. The situations that cause poor quality film when reproducing by the diazzo method are discussed. In addition, situations that cause heat splices to break are mentioned. (Author)

AD-640 083 **Field 5B, 5G**
CFSTI Prices: HC$2.00 MF$0.50
Lehigh Univ., Bethlehem, Pa. Center for the Information Sciences.
A FORMAL THEORY OF CONCEPTUAL AFFILIATION FOR DOCUMENT RECONSTRUCTION. REPT. NO. 1: THE AFFILIATION-VALUE MODEL.
Interim rept. 1 Nov 65-31 Oct 67,
by Robert C. Heiser, and Donald J. Hillman. 22 Aug 66, 32p
Grant AF-AFOSR-1028-66
Proj. AF-9769
Task 976902

Descriptors: (*Reports, Information retrieval), (*Subject indexing, *Computational linguistics), Mathematical models, Classification, Grammars.

Identifiers: Indexing terms.

It is first argued that there are significant logical and epistemological issues involved in the development of an adequate text-processing procedure for document retrieval systems. A brief discussion of these issues follows. It is next shown that the problem of characterizing or indexing a document is a particular form of the general logical problem of abstraction. The report introduces the notion of concretion into retrieval theory, and discusses the problem of reconstructing documents from their given characteristics. A major goal is to show that different coherence patterns for characteristics indicate differences among documents as to form, style, structure and content. An affiliation-value model is constructed, in terms of which the conceptual closeness and importance of characteristics to their parent documents are numerically expressible. Document structure, organization and content are reflected in the calculation of affiliation-values, so that it becomes possible to identify the form and nature of documents given only certain minimal information regarding their characteristics or index terms. (Author)

AD-640 100 **Field 5B, 9B**
CFSTI Prices: HC$7.00 MF$1.75
Booz, Allen Applied Research, Inc., Bethesda, Md.
STUDY OF MECHANIZATION IN DOD LIBRARIES AND INFORMATION CENTERS,
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 354p Rept. no. 914-1-1
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), (*Technical information centers, Automation), Data storage systems, Information retrieval, Digital computers, Electronic accounting machines, Documentation, Department of Defense.

Identifiers: Information systems.

The report summarizes the on-site study of mechanization in DoD libraries and information centers. Included are presentations and evaluations on thesaurus building, file structure, input processing, serial control, selective dissemination of information, circulation control, equipments being used, recommendations on information retrieval systems, observations on organization, operation and application, and summaries on mechanization status, scope and size of collections, and COSATI subject area breakdowns. 76 facilities were visited; individual reports were generated for 35. Abstracts for the 35 reports and their DDC AD numbers are included. (Author)

AD-640 101 **Field 5B, 9B**
CFSTI Prices: HC$3.00 MF$0.75
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE U. S. ARMY HARRY DIAMOND LABORATORIES TECHNICAL INFORMATION OFFICE, WASHINGTON, D. C.
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 60p Rept. no. 914-1-2
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Information retrieval, Digital computers, Electronic accounting machines, Reports, Periodicals, Army.

Identifiers: KWIC index.

Mechanized library functions are performed on the IBM 7094 and 1410 computers using the Approach-By-Concept (ABC) storage and retrieval system. At present, mechanization is applied only to technical reports. The four outputs are accessions lists with supplementary KWIC Index, catalog cards, the ABC Dictionary, and current-awareness notifications. These notifications are provided as a result of the Martin Company contract for analyses of current open-source publications in selected subject areas. Because of file organization problems encountered in the first-generation model of the ABC system, a second-generation model was developed which will become operational in the near future. Periodicals are presently controlled with the aid of EAM techniques with a view to computerization in the near future. The Library staff states that the program has developed smoothly, with problem areas being worked out before they became serious. (Author)

AD-640 102 **Field 5B, 9B**
CFSTI Prices: HC$4.00 MF$1.00
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION SURVEY OF THE ARMY BIOLOGICAL LABORATORIES TECHNICAL LIBRARY, FORT DETRICK, MARYLAND.
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 127p Rept. no. 914-1-4
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Army, Dissemination, Information retrieval, Data storage systems, Digital computers, Indexes.

Identifiers: Selective dissemination of information.

The Technical Information Division of the U. S. Army Biological Laboratories has three mechanized programs: Selective Dissemination of Information (SDI), Serials Processing System, and Retrospective Search File. The SDI Program uses magnetic tapes from the National Library of Medicine to generate monthly lists of journals and monographs that match the interest profiles of participating scientists. The Serials Processing System provides a list of the journal holdings for periodical control. The Retrospective Search File of about 8,000 document records is used for bibliographic searches, for inventory control, and to produce book catalogs and accession lists. Input to this file is confined to Fort Detrick and contractor reports. All three program systems are run on the UNIVAC SS-II computer. A new unit record, comparable to DDC's record, is planned for the Retrospective Search File. The SDI Program is expected to grow to about 350 participants, and information from Biological Abstracts and similar publications will be added to the input citation files. (Author)

AD-640 103 **Field 5B, 9B**
CFSTI Prices: HC$6.00 MF$1.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE TECHNICAL LIBRARY BUREAU OF SHIPS, NAVY DEPARTMENT, WASHINGTON, D. C.

Technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 283p 914-1-5
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Information retrieval, Digital computers, Bibliographies, Navy, Periodicals, Costs.

Identifiers: SHARP project, Thesauri.

The mechanized system used in the Technical Library at the Bureau of Ships (BUSHIPS) is called the SHips Analysis and Retrieval Project (SHARP). SHARP is a computer-oriented information storage and retrieval system developed to resolve some of the problems inherent in the handling, storage and retrieval of scientific and technical literature at the BUSHIPS Technical Library. The IBM 7090 computer was used during the development and early operational stages of the SHARP system; conversion to the Livermore Atomic Research Computer (LARC) at David Taylor Model Basin has been completed. The computer is being used to automate bibliographic searches; subject matter searches; coordinated searches; issuance of library catalog cards and accessions bulletins; control of periodicals and journals; and other aspects under development, such as complete automatic generic computer searching, automatic posting of descriptive terms by the computer in the indexing procedure, and user interest registers. Both the Library and the users appear to be satisfied with the results of the system programs that are operational. (Author)

AD-640 104 **Field 5B, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE U. S. ARMY NATICK LABORATORIES TECHNICAL LIBRARY, NATICK, MASS.
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 32p Rept. no. 914-1-7
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Army, Electronic accounting machines, Punched tape, Information retrieval.

Identifiers: Selective dissemination of information, Information systems.

The Library at the Natick Laboratories uses EAM punched card storing techniques in circulation control and in the generation of master holdings lists of periodicals and journals, subscription renewal, binding lists, and a current titles checklist. The EAM punched cards are also being applied to a survey of title usage. A Flexowriter tape is used to produce catalog cards. Also in process is the subject indexing of the Laboratories' notebooks on EAM cards. Under the Army Technical Library Improvement Study, the Natick Library has been assigned resposibility for a pilot SDI study, matching new acquisitions against user profiles. This program will probably use the Laboratories' GE 225 computer. Future plans call for the introduction of the Southern Illinois University system of circulation. Consideration is also being given to the introduction of a computer and the IBM 870 system which will greatly diminish the Library's dependence on Natick's central computer section. Realization of these plans will depend upon the growth of the Library's responsibilities, the addition of professionals to the Library's staff, and available space within the Library for the necessary equipment. (Author)

AD-640 105 **Field 5B, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Booz, Allen Applied Research Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE NONDESTRUCTIVE TESTING INFORMATION CENTER
ARMY MATERIALS RESEARCH AGENCY, WATERTOWN, MASS.
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 22p Rept. no. 914-1-8
Contract DSA-7-15489

Descriptors: (*Technical information centers, Automation), (*Non-destructive testing, Technical information centers), Information retrieval, Data, Army.

Identifiers: Coordinate indexing, Peek-a-boo cards.

The Nondestructive Testing Information Center uses the Termatrex system of coordinate indexing to identify and retrieve desired abstract cards and documents in their collection. The system uses visual coincidence ('peak-a-boo') term cards in which holes are drilled in specific locations to represent documents possessing a particular term. Documents identified by a group of desired terms may be retrieved by superimposing the term cards and observing the resulting coincident holes. The present set of cards is capable of handling up to 10,000 documents. Expansion beyond this capacity requires an additional deck of term cards that must be processed and searched separately. Since the Termatrex systm is an economical, rapid retrieval system that fills the Center's needs, no plans have been made for the application of computer techniques. (Author)

AD-640 106 **Field 5B, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE U. S. ARMY PICATINNY ARSENAL, DOVER, NEW JERSEY.
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 48p Rept. no. 914-1-11
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Digital computers, Army, Data processing systems, Documentation, Information retrieval, Army.

The circulation of books and technical reports (both classified and unclassified) at Picatinny Arsenal's Library is mechanized by the IBM 7090 and 1401 computers, producing seven outputs. At present, mechanized preparation of catalog cards, maintenance of catalog authorities, preparation of bibliographies and accessions lists, routing of periodicals, and control of classified reports are under development. Routing of periodicals should be operational early in 1966. An SDI system is under consideration. Work measurement and standard time data studies on the efficiency of the system indicate that the mechanized circulation system is much more efficient than the previous manual one. (Author)

AD-640 107 **Field 5B, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE PLASTICS TECHNICAL EVALUATION CENTER, U. S. ARMY PICATINNY ARSENAL, DOVER, N. J.
Technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 34p 914-1-12
Contract DSA-7-15489

Descriptors: (*Technical information centers, Automation), Army, Plastics, Reports, Indexes, Data, Digital computers.

Identifiers: Information systems.

Under contract to the Center, Franklin Institute processes R and D reports for input to the Honeywell 140 computer. The major output is the PLASTEC Document Index; four other outputs are used for control purposes. The computer program is limited to alphabetization and arrangement functions. No machine retrieval has been attempted. The index contains document numbers which refer to a storage location at PLASTEC. Without a companion volume of citations related to these numbers (which does not exist at present), the Index is of no value to an outside reader and is therefore not distributed. (Author)

AD-640 108 **Field 5B, 9B**
CFSTI Prices: HC$3.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE DEFENSE INDUSTRIAL SUPPLY CENTER TECHNICAL LIBRARY, PHILADELPHIA, PENNSYLVANIA.
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 57p Rept. no. 914-1-13
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Department of Defense, Mechanical drawings, Electronic accounting machines, Indexes, Catalogs, Specifications, Standards, Digital computers, Digital systems.

Identifiers: Descriptive cataloging.

Mechanization at the Defense Industrial Supply Center (DISC) Technical Library consists of EAM cataloging of books, specifications and standards, engineering drawings on microfilm aperture cards, and manufacturer's catalogs. All four systems have been developed, but only the engineering drawing and book systems are operational. The output from the engineering drawing system, the Engineering Drawing Index, is printed out in four listings, each arranged with pertinent numbers in a different order. The output from the book system, the Book Index, is prepared in three volumes: an alphabetical author list, an alphabetical title list, and a Dewey Decimal classification number arranged list. (Author)

AD-640 109 **Field 5B, 9B**
CFSTI Prices: HC$3.00 MF$0.75
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE TECHNICAL LIBRARY, AIR FORCE CAMBRIDGE RESEARCH LABORATORY, L. G. HANSCOM FIELD, MASSACHUSETTS.
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 60p Rept. no. 914-1-14
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Air Force, Catalogs, Punched tape, Information retrieval, Digital computers.

Identifiers: Descriptive cataloging, Crossfiler special purpose computer, PDP-1 computer.

The Technical Library has developed a unique semimechanized process for the production of catalog cards, charge cards, card pockets, and accessions lists, and a machine-readable punched paper tape record for a future computer-produced book catalog. This system was originally based on a special purpose digital processor, called the Crossfiler, which multiplies catalog card records, inputed on punched paper tape and supplies entry headings for each of the copies. Actual printing is done on a Flexowriter. The Library recently began employing the PDP-1 computer to perform this task and has phased out the Crossfiler. A periodical control system is being developed utilizing the Laboratory's IBM 7044 computer. The library plans to convert its paper tape records to magnetic tape for computer production of a book catalog and computer-run retrospective searches. (Author)

AD-640 110 Field 5B, 9B
CFSTI Prices: HC$2.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE LIBRARY, U. S. NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIFORNIA.
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 37p Rept. no. 914-1-15
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Navy, Reports, Subject indexing, Data processing systems, Periodicals, Information retrieval, Digital computers, Electronic accounting machines, Education.

Identifiers: Descriptive cataloging, SABIR.

A mechanized system is used by the Naval Postgraduate School Library for bibliographic control of its technical documents collection. Descriptive and subject cataloging information is stored on magnetic tape, and literature searches are made. The program used, called SABIR2, is written in assembly language for the CDC 1604 computer. Automatic data processing equipment is also used to produce title and subject lists of the Library's holdings of periodicals. The Library is satisfied with the mechanized system with regard to retrieval relevancy, recall, and usefulness of the end product. (Author)

AD-640 111 Field 5B, 9B
CFSTI Prices: HC$2.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE TECHNICAL LIBRARY, U. S. NAVAL MISSILE CENTER, POINT MUGU, CALIFORNIA.
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 33p Rept. no. 914-1-16
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Catalogs, Navy, Guided missiles, Digital computers, Information retrieval.

The Naval Missile Center Library uses the IBM 7094 and IBM 1401 to produce a cumulative monthly and annual catalog of the technical document collection. This catalog is printed out in two parts: source and subject. The mechanized system used at the Center is the Technical Library Program Series. A mechanized system for circulation control will be introduced in the near future. If demands on the Library intensify, the computer will be used for literature searches in the document collection. This could be initiated easily, as the subject descriptors for each document are already on the tapes. Efficiency of the Documents Branch is considerably enhanced by the system because the catalog is produced very quickly after the monthly input is completed. (Author)

AD-640 112 Field 5B, 9B
CFSTI Prices: HC$2.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE TECHNICAL LIBRARY U. S. NAVAL SHIP MISSILE SYSTEMS ENGINEERING STATION, PORT HUENEME, CALIFORNIA.
Technical rept.
Sep 66, 36p 914-1-17
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Navy, Indexes, Digital computers, Costs, Guided missiles, Shipborne, Bibliographies, Subject indexing.

Identifiers: Key words.

The Technical Library at the U.S. Naval Ship Missiles Systems Engineering Station (USNSMSES) employs data processing equipment in the indexing of all materials regardless of subject or format. The indexes are printed out in book form by computer. A statistical inventory of the collection is maintained automatically. IBM 705 and 1401 computers are employed in the mechanized system. Although the costs of the file conversion to the system were high, the large volume of data being processed appears, in the Library's opinion, to justify the use of computers. (Author)

AD-640 113 Field 5B, 9B
CFSTI Prices: HC$2.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE DMIC, BDIC, RACIC, AND REIC INFORMATION CENTERS OF THE BATTELLE MEMORIAL INSTITUTE, COLUMBUS, OHIO.
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 50p Rept. no. 914-1-18
Contract DSA-7-15489

Descriptors: (*Technical information centers, Automation), Information retrieval, Digital computers, Electronic accounting machines, Dictionaries, Indexes, Punched cards.

Identifiers: REIC, RACIC, BDIAC, DMIC.

Four of the information centers operated by the Battelle Memorial Institute were included in the library mechanization study. The CDC 3400 computer is used for any mechanization although this was not extensive at the time of the survey. A Flexowriter is used by BDIC to produce a monthly list of documents for security classification downgrading and by REIC to produce a monthly accessions list with abstracts and coordinate index, and a semiannual compilation of government-sponsored contracts relative to radiation-effects research. RACIC uses Flexowriter edge-punched cards to produce a security log of secret cards in the file. DMIC uses a Termatrex coordinate index system to store and retrieve references to government-sponsored contracts of interest to the Center. REIC uses a mechanized process to punch EAM cards which are used to produce a listing of clue words and a listing of reports with accession numbers. REIC has also initiated the development of a thesaurus. RACIC has mechanized its listing of clue words and is experimenting with a computer program to produce a clue-word coordinate index from a file of EAM punched cards. All four centers consider that their manually produced and searched files of extracts are preferable to a computerized system. However, they feel that additional mechanization of their printed outputs would be desirable as a time-saving feature wherever it would prove economical. (Author)

AD-640 114 Field 5B, 9B
CFSTI Prices: HC$1.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE AIR FORCE INSTITUTE OF TECHNOLOGY LIBRARY, WRIGHT-PATTERSON AFB, OHIO.
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 21p Rept. no. 914-1-19
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Air Force, Electronic accounting machines, Digital computers, Punched cards, Periodicals.

Identifiers: Flexowriters.

The Air Force Institute of Technology (AFIT) Library uses an IBM 1401 computer to produce a list of journal holdings, alphabetically arranged and provided with an abbreviation glossary. One list was produced and circulated. Input to the system is EAM cards with journal data. Because of difficulties in obtaining use of the computer--which is not owned by the Library--within a reasonable time, the Library has decided to abandon computer mechanization and to use instead Library--owned Flexowriter equipments interfaced with supplemental EAM card punch, sorter, and reader. (Author)

AD-640 115 Field 5B, 9B
CFSTI Prices: HC$2.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE RECON CENTRAL, RECONNAISSANCE DIVISION, AIR FORCE AVIONICS LAB., WRIGHT-PATTERSON AFB, OHIO.
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 34p Rept. no. 914-1-20
Contract DSA-7-15489

Descriptors: (*Technical information centers, Automation), Punched cards, Input-output devices, Air Force, Information retrieval, Military intelligence, Data storage systems, Microfilm.

Identifiers: Coordinate indexing, Peek-a-boo cards, Flexowriters.

Information storage and retrieval functions at the Recon Central are partially mechanized by a system composed of 'peek-a-boo' coordinate index cards, a Flexowriter automatic typewriter with an EAM punched card reader input and an automatic 'peek-a-boo' card reader, and various types of copying devices. The stored information is primarily in document abstract form on microfilm chips that are on unpunched aperture cards. The system produces for a search requester lists of retrieved abstract accession numbers with corresponding document titles, and, if desired, enlarged copies of the selected microfilm chips. Recon Central estimates that cost investment in this semiautomated system is about one-tenth that of a fully computerized system giving the same performance in their application. (Author)

AD-640 116 Field 5B, 9B
CFSTI Prices: HC$2.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE RELIABILITY CENTRAL ROME AIR DEVELOPMENT CENTER, GRIFFISS AIR FORCE BASE, N. Y.
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 31p Rept. no. 914-1-21
Contract DSA-7-15489

Descriptors: (*Technical information centers, Automation), Information retrieval, Digital computers, Handbooks, Data storage systems, Air Force, Electronic equipment, Reliability (Electronics).

Computer mechanization of the Reliability Central (RC) at Rome Air Development Center (RADC) is currently being designed and partially implemented, by contractors. RC will be an information center but will not ordinarily distribute source documents. It will retain hard copy from which raw data on electronic parts have been obtained, and it will maintain the raw data in computer files and will manipulate and interpret these data to produce handbooks in various summary forms to be widely distributed throughout the scientific community. It will also entertain queries for information obtainable from the data base but not found in the handbooks. The program will be operated on the RC computer complex following the test operation planned for March 1967. (Author)

AD-640 117 **Field 5B, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE U. S. NAVY MARINE ENGINEERING LABORATORY LIBRARY, ANNAPOLIS, MARYLAND.
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 18p Rept. no. 914-1-22
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Punched cards, Digital computers, Information retrieval, Programming (Computers), Marine engineering, Navy, Periodicals.

Identifiers: Information systems.

Computer mechanization at the U.S. Navy Marine Engineering Laboratory (MEL) Library presently consists of production of a journal listing on an IBM 1401 computer from punched cards. When the computer file of information on reports is expanded, it will be the data base for bibliographic searches and retrieval of information. This data base will be maintained and processed by the Information Storage Package, a series of computer programs developed by the Applied Physics Laboratory of Johns Hopkins University. The MEL Library feels that, while the Information Storage Package is useful, a universally accepted information system would be more beneficial for all aspects of library mechanization; with such a system, centralized cataloging might become feasible. (Author)

AD-640 118 **Field 5B, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE DEFENSE LOGISTICS STUDIES INFORMATION EXCHANGE, FORT LEE, VIRGINIA.
Technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 39p 914-1-23
Contract DSA-7-15489

Descriptors: (*Technical information centers, Automation), Department of Defense, Logistics, Information retrieval, Digital computers, Bibliographies, Catalogs.

An RCA 501 computer is used by the Defense Logistics Studies Information Exchange to produce a thesaurus, demand bibliographies, code listings, and the 'Annual Department of Defense Bibliography of Logistics Studies and Related Documents'. A card catalog file is maintained but will probably be discarded within 5 to 10 years. The Exchange has applied for status as a DoD Information Analysis Center; it has also been assigned an additional mission of maintaining a 'DoD Inventory of Technical Data and Related Efforts'. Development of the thesaurus will continue, and the Annual Bibliographies and Quarterly Supplements will be printed by GPO from data on magnetic tape as soon as equipment becomes available at GPO. A survey conducted in 1963 indicated that patrons were satisfied with the services provided by the Exchange. (Author)

AD-640 119 **Field 5B, 9B**
CFSTI Prices: HC$3.00 MF$0.75
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE TECHNICAL LIBRARY U. S. NAVAL WEAPONS LABORATORY DAHLGREN, VIRGINIA.
Technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini.Sep 66, 65p 914-1-24
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Information retrieval, Navy, Weapons, Digital computers, Electronic accounting machines, Punched cards.

The Naval Weapons Laboratory (NWL) Technical Library is redeveloping a mechanized system that uses the IBM 7090 and 1401 computers for the IBM 870 Document Writing System and the IBM 7030 computer (STRETCH). Mechanized processes in the IBM 7090 System provide for the establishment and maintenance of a master file for reports and the search of this file to satisfy requests from Library users. The 870, 7030 System is expected to increase the timeliness of accession bulletins and catalog cards, increase the efficiency of Library procedures (Descriptive cataloging, Typing, and keypunch are combined into one step), and give the Library more control over procedures (e.g., punched cards instead of worksheets will be sent to computer operations, and generation of accessions bulletins and catalog cards will no longer involve computer operations). (Author)

AD-640 120 **Field 5B, 9B**
CFSTI Prices: HC$4.00 MF$0.75
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE REFERENCE LIBRARY, JOHNS HOPKINS UNIVERSITY, APPLIED PHYSICS LABORATORY.
Technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini.Sep 66, 113p 914-1-25
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Digital computers, Information retrieval, Bibliographies, Data processing systems, Physics.

The Applied Physics Laboratory (APL) Reference Library uses IBM 7094 and 7040 computers to produce a quarterly list of serials holdings and a quarterly union list of serials, including APL's holdings and those of other participating libraries. The APL Document Library uses these computers to produce an accession list, selective bibliographies in accordance with its SDI program, and reference or demand bibliographies as a result of search requests. The repertoire of programs used was designated the Information Processing System. (Author)

AD-640 121 **Field 5B, 9B**
CFSTI Prices: HC$3.00 MF$0.75
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE TECHNICAL LIBRARY, U. S. ARMY MAP SERVICE, WASHINGTON, D. C.
Technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 65p 914-1-26
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Army, Maps, Digital computers, Bibliographies, Information retrieval, Periodicals.

The Army Map Service (AMS) Library uses a Univac 1004 computer to produce map accessions lists and bibliographies from punched cards containing printed text. Also data on a Map Reproduction (Repromat) File are punched onto cards and transferred to magnetic tape on a Honeywell H-800 computer. This tape is used to produce a high-speed printout of the Repromat Tabulation semi-annually and a monthly listing to update the semi-annual tabulation. It is felt that the mechanized Repromat File system should be modified in a number of ways for greater efficiency. (Author)

AD-640 122 **Field 5B, 9B**
CFSTI Prices: HC$4.00 MF$0.75
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE TECHNICAL LIBRARY, NAVAL ORDNANCE LABORATORY, WHITE OAK, MARYLAND.
Technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 110p 914-1-27
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Navy, Ordnance, Reports, Digital computers, Information retrieval, Periodicals, Electronic accounting machines.

The Library at the Naval Ordnance Laboratory (NOL) uses the IBM 7090 computer for information storage and retrieval of its technical reports collection. All technical reports are eventually entered on microfilm, with the present collection totaling about 150,000. However, only documents received from 1958 to the present are available for computer searches. Plans call for an annual listing by EAM techniques, of periodicals received at NOL. During fiscal 1966, punched card preparation will be completed. In addition, NOL and the Applied Physics Laboratory at Johns Hopkins are considering the possibility of cooperatively producing an annual listing of periodicals available in technical libraries in the Washington-Maryland area. There is also a study being conducted at present to determine the feasibility of a printed book catalog. The computer program has provided more exhaustive searches and more detailed subject analysis of reports and has eliminated the time lag in processing subject information. (Author)

AD-640 123 **Field 5B, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE TECHNICAL LIBRARY, U. S. ARMY EDGEWOOD ARSENAL, EDGEWOOD, MARYLAND.
Technical rept.
Sep 66, 38p 914-1-28
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Information retrieval, Punched cards, Punched tape, Data processing systems, Army.

The Edgewood Arsenal Technical Library uses a retrieval system designed and developed for the Library by a contractor. The contractor indexes and processes documents on punched cards, and tapes generated on the Contractor's IBM 1401 are converted to Honeywell 200/400 tapes for use on EA's Honeywell computer by National Institutes of Health and Army Map Service. Search outputs enable the user to obtain desired items from the Library by use of the pertinent call numbers. The addition of an alphabetic printout capability of the existing system is now in the operational testing stage. The hopes of the designers of the system to provide half-day response to user questions have thus far been frustrated by several factors, including the high cost of operating the system and its low speed. (Author)

AD-640 124 **Field 5B, 9B**
CFSTI Prices: HC$3.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE AEROSPACE MATERIALS INFORMATION CENTER (INCLUDING CERAMICS AND GRAPHITES TECHNICAL INFO CENTER), WRIGHT-PATTERSON AFB, OHIO.
Technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini.Sep 66, 52p 914-1-29
Contract DSA-7-15489

Descriptors: (*Technical information centers, Automation), Information retrieval, Digital computers, Indexes, Air Force.

Identifiers: KWIC index.

By use of the IBM 7094, the Materials Laboratory performs searches and produces the KWIC index section of the 'Materials Information Bulletin.' Under contract to the Materials Laboratory, thesaurus maintenance, keyword index printing, and data-base updating are performed on the NCR 304 computer at the University of Dayton. The use of deep indexing with links and roles formed the basis of the system; after evaluating the value of links and roles, however, roles were eliminated. A Miracode system just recently purchased will be used to store Materials Laboratory information. Several studies covering specific areas of this system have been conducted. Currently, the Center is sending questionnaires to certain groups after running searches for them to determine the value of each search. (Author)

AD-640 125 **Field 5B, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE ARMY STUDY DOCUMENTATION AND INFORMATION RETRIEVAL SYSTEM, U. S. ARMY LIBRARY, WASHINGTON, D. C.
Technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 26p 914-1-30
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Army, Documentation, Information retrieval, Indexes, Catalogs, Digital computers, Bibliographies.

Identifiers: Descriptors, Permuted-title indexes, Thesauri, Descriptive cataloging, Indexing terms.

The objectives of the Army Study Documentation and Information Retrieval System (ASDIRS) are to provide a central library of Army studies readily accessible in the Pentagon. At the present time, a bibliographic quarterly catalog of Army studies and a permuted descriptor/title index are provided. The catalog of Army studies is produced using an IBM 1401 computer, and the permuted descriptor title index to the catalog is produced using an IBM 7090 computer. The central library of Army studies will provide a reference card file and the Termatrex retrieval system for easy subject access to the collection. The bibliographic catalog is distributed Army-wide and has been favorably received. (Author)

AD-640 126 **Field 5B, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE TECHNICAL LIBRARY U. S. NAVAL AVIONICS FACILITY, INDIANAPOLIS, INDIANA.
Technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 32p 914-1-31
Contract DSA-7-15489

Descriptors: (*Libraries, Automation), Navy, Indexes, Periodicals, Digital computers, Electronic accounting machines.

Identifiers: Permuted-title indexes, KWIC index, Information systems.

The Naval Avionics Facility, Indianapolis (NAFI) Technical Library is planning a mechanized system to produce a permuted index of pertinent periodical references and proceedings, with books and documents to be added later. Input to the system is punched paper tape prepared from the source material, and the primary program is a 'canned' General Electric permuted index program for NAFI's GE 225 computer. NAFI's Burroughs 280 computer is used to obtain special listings of EAM card information. The Library feels that the permuted index system is a relatively simple and inexpensive way to mechanize Library files. (Author)

AD-640 127 **Field 5B, 5I**
CFSTI Prices: HC$2.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE THERMOPHYSICAL PROPERTIES RESEARCH CENTER, PURDUE UNIVERSITY.
Technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 31p 914-1-33
Contract DSA-7-15489

Descriptors: (*Technical information centers, Automation), Information retrieval, Digital computers, Thermodynamics, Magnetic tape.

The data files at the Thermophysical Properties Research Center (TPRC) are stored on magnetic tape and are used for mechanized retrospective searches and to produce the original copy for the Center's 'Retrieval Guide to Thermophysical Properties Research Literature' publication. In the near future, the Center will be connected directly to Purdue's computer center via a UHF radio circuit. Partly because of the relatively frequent changes in computer equipment, the Center has limited its use of mechanized processes. The Director believes that at present his staff can perform most searches faster by manual reference than by machine. (Author)

AD-640 128 **Field 5B, 9B**
CFSTI Prices: HC$3.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE ELECTRONIC PROPERTIES INFORMATION CENTER, HUGHES AIRCRAFT COMPANY, CULVER CITY, CALIFORNIA.
Technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 56p Rept. no. 914-1-34
Contract DSA-7-15489

Descriptors: (*Technical information centers, Automation), Data storage systems, Digital computers, Information retrieval, Subject indexing, Electronics, Aircraft.

The Electronic Properties Information Center (EPIC) at Hughes Aircraft Company utilizes mechanized processes for storage and retrieval of information. Outputs of the mechanized system, which is designed for the Honeywell 200 computer, are a printed file of materials with related properties, an accessions list, and a search printout of retrieved bibliographic citations with abstracts. A new system being developed for EPIC's mechanized activities is being designed for the General Electric 635 computer; this is part of a generalized information retrieval system being developed for several related activities at Hughes. EPIC is very satisfied with the results of its mechanization programs. (Author)

AD-640 129 **Field 5B, 5I**
CFSTI Prices: HC$3.00 MF$0.50
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE REDSTONE SCIENTIFIC INFORMATION CENTER, REDSTONE ARSENAL, ALABAMA.
Final technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 56p Rept. no. 914-1-35
Contract DSA-7-15489

Descriptors: (*Technical information centers, Automation), Digital computers, Libraries, Information retrieval, Data processing systems, Dissemination, Army.

The Redstone Scientific Information Center (RSIC) is engaged in a major effort to mechanize its Library operations using IBM 7010, 1460, and 1401 computers. The total integrated effort is known as ALPHA (Automated Literature Processing, Handling and Analysis System), which is a serial system operating on a batched transaction basis. The system is in first-generation stage of development. At present, the mechanized routines for the acquisition and circulation of books, periodical control, and the Patron File are fully operational. RSIC also receives NASA tapes and utilizes them in literature searches. In addition, NASA headquarters is sponsoring an information automation project in which RSIC is participating. This is a prototype test of the current selective dissemination of information based on IBM's SDI programs. Several programs are being planned or developed for mechanization in addition to the above. (Author)

AD-640 130 **Field 5B, 9B**
CFSTI Prices: HC$4.00 MF$0.75
Booz, Allen Applied Research, Inc., Bethesda, Md.
MECHANIZATION STUDY OF THE VESIAC, BAMIRAC, AND IRIA INFORMATION CENTERS, UNIVERSITY OF MICHIGAN.
Technical rept.,
by G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, and E. Merendini. Sep 66, 105p Rept. no. 914-1-36
Contract DSA-7-15489

Descriptors: (*Technical information centers, Automation), Bibliographies, Digital computers, Electronic accounting machines, Information retrieval, Abstracts, Universities, Michigan.

Identifiers: VESIAC, IRIA, BAMIRAC.

Three information and analysis centers of the Institute of Science and Technology, University of Michigan, utilize the computer and EAM facilities of the Institute's Computation Department for retrieval of bibliographic references based upon the Computation Department's generalized retrieval system. The three centers are Infrared Information Analysis Center (IRIA), VELA Seismic Information Analysis Center (VESIAC), and Ballistic Missile Radiation Analysis Center (BAMIRAC). IRIA utilizes the mechanized retrieval program, which uses an IBM 1401 computer, to produce two listings. VESIAC is in the pilot stage of producing demand bibliographies using the mechanized information retrieval program. BAMIRAC utilizes an optional arrangement of manual, EAM, and mechanized techniques to provide demand bibliographies including abstracts. The development of a generalized retrieval program for all three centers has eliminated the need for the more costly process of maintaining a specialized program for each center. Because of center similarities, this general program fits each center's requirements without significant difficulty.

AD-640 283 **Field 5B, 5H, 9B**
CFSTI Prices: HC$1.00 MF$0.50
International Business Machines Corp., Poughkeepsie, N. Y. Data Systems Div.
PSYCHOLOGY FOR A MAN-MACHINE PROBLEM-SOLVING SYSTEM.
Technical rept.,
by Robert B. Miller. 19 Feb 65, 22p TR-00.1246

Descriptors: (*Problem solving, Man-machine systems), (*Information retrieval, Man-machine systems), Computers, Human engineering, Subject indexing, Psychology.

The paper deals with the use of computer capabilities to extend human capabilities for invention and discovery. A programmatic route is proposed for development. The first stage in this route is an analytic enumeration of human abilities and liabilities as a problem-solving mechanism. The second stage will deal with an analysis of human in-

formation-handling tasks. These two stages should illuminate system objectives, while at the same time options for designing the man-machine problem-solving entity become clarified. The result will be an intelligence-retrieval system combined with logical and extraordinary display capabilities. The principal design issues will be revealed as indexing content and structure and display symbologies. An important (and neglected) dimension in system design is the human's ability to learn and think in new languages and symbologies. (Author)

AD-640 463 **Field 5B, 8A, 8C, 8J K**
CFSTI Price3 MF$1.25
Naval Oceanographic Office, Washington, D. C.
GLOSSARY OF OCEANOGRAPHIC TERMS.
2d. ed.,
by B. B. Baker Jr, W. R. Deebel, and R. D. Geisenderfer. 1966, 208p SP-35
Availability: U. S. Naval Oceanographic Office; also by Superintendent of Documents, GPO, Washington, D. C., 20402 $2.25, as D203.22/3:35.

Descriptors: (*Oceanology, *Dictionaries).

N66-28039 **Field 5B**
CFSTI Prices HC$1.00 MF$0.75
National Aeronautics And Space Administration, Washington, D. C.
BIBLIOGRAPHIES ON AEROSPACE SCIENCE - A CONTINUING BIBLIOGRAPHY WITH INDEXES, FEBRUARY 1965 - APRIL 1966.
Jun 66, 100p NASA-SP-7006/02/

Descriptors: *Abstract, *Aerospace technology, *Bibliography, *Space science, Aerodynamics, Aerospace, Analysis, Astronomy, Astrophysics, Biology, Body, Control, Cosmology, Effect, Exploration, Factor, Flight, Lunar, Medicine, Orbit, Physiology, Planetary, Psychology, Radiation, Science, Space, Surface, Technology, Trajectory.

For abstract, see S 04 15.

N66-35686 **Field 5B**
CFSTI Prices HC$3.75 MF$2.50
National Aeronautics And Space Administration, Washington, D. C.
GUIDE TO THE SUBJECT INDEXES FOR SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS.
Aug 66, 471p NASA-SP-7016, REV. 3

Descriptors: *Aerospace technology, *Data processing, *Information retrieval, *Space science, Aerospace, Communications, Data, Index, Information, Processing, Retrieval, Science, Space, Star, Storage, Technology.

For abstract, see S 04 21.

PB-172 870 **Field 5B, 15E**
CFSTI Price: HC$19.50
Air Force Systems Command, Washington, D. C.
MANAGEMENT OF CONTRACTOR DATA AND REPORTS.
Joint AFSC/AFLC Manual.
15 Mar 64, 2102p AFSCM-310-1
AFLCM-310-1
Prepared in cooperation with Air Force Logistics Command, Washington, D. C. See also PB-172 869.

Descriptors: (*Data, Processing), (*Reports, Processing), Costs, Documentation, Management control systems, Military requirements, Instruction manuals.

The report contains the approved AFLC/AFSC Forms 9, 'Data Item' which are authorized for possible use in a Contractor Data Requirements List (DD Form 1423); a list of ASPR and AFPI clauses authorized for use on a contract; and sufficient instructions and indexes to facilitate ready access to the appropriate Data Item. (Author)

PB-173 070 **Field 5B**
CFSTI Prices: HC$1.10 MF$0.50
Rochester Univ., N. Y. Library.
MISERY IS A SHORT FOOTNOTE,
by Phyllis A. Richmond. 1965, 5p
NSF Scientific Documentation Project. Library Resources and Technical Services v9 n2 p221-4 Spring 1965.

Descriptors: (*Periodicals, Documentation).

Identifiers: Abbreviations, Citations.

The problem of referring to titles and authors of journal articles in bibliographic citations is discussed; particularly abbreviations and shortening of words making up the titles.

PB-173 090 **Field 5B**
CFSTI Prices: HC$4.00 MF$0.75
North American Aviation, Inc., Downey, Calif. Space and Information Systems Div.
ANALYSIS OF SCIENTIFIC AND TECHNICAL INFORMATION REQUIREMENTS OF FAA.
Final rept.,
by R. Mason. 25 Oct 65, 123p SID-65-1397
Contract FA64WA-5213

Descriptors: (*Aeronautics, *Documentation), (*Libraries, Aeronautics), Information retrieval, Management engineering, Operations research.

Identifiers: FAA, User surveys.

A three-phase survey was conducted to determine the scientific and technical information requirements of the FAA. Phase I was an inventory of the present resources and services offered by the FAA libraries. Phase II was a detailed questionnaire survey of 3818 FAA personnel to determine their present information acquisition methods and needs. An unprecedented 92-percent response was obtained. A series of eleven charts present the questionnaire survey results. Phase III was an in-depth interview with 76 top management personnel. As a result of the detailed analysis of the results of those surveys a series of recommendations are made. They are grouped as recommendations for immediate implementation, phased implementation over a five-year period, or study recommendations. Major recommendations involved means to further acquaint FAA employees with present library services and means to keep the FAA current with technical information handling advances. (Author)

PB-173 126 **Field 5B, 9B**
CFSTI Prices: HC$4.60 MF$0.50
Inforonics, Inc., Maynard, Mass.
PROBLEMS OF RECORDING TEXT INFORMATION IN MACHINE FORM FOR USE IN A SCIENTIFIC INFORMATION COMMUNICATION NETWORK.
Rept. for 15 Jun 64-31 Mar 66,
by Lawrence F. Buckland. 24 May 66, 49p
Contract NSF-C371
Rept. on NSF Scientific Documentation Project.

Descriptors: (*Documentation, *Computational linguistics), Magnetic tape, Man-machine systems, Information retrieval, Coding, Information theory, Indexes, Bibliographies, Libraries.

Identifiers: Descriptive cataloging, Scientific information.

The need for systems for recording text in machine form is justified by a survey of the potential applications of a machine record in libraries; abstracting and indexing organizations, information centers and professional societies. The design of a system to record and exchange text data requires specifying the text items to be encoded, development of consistent uses of symbols and abbreviations, development of keyboarding techniques and the use of computers for text composition. An analysis of the differences between the form of text items in primary publications and their form in secondary publications shows this to be a formidable problem, and especially complex if the range of secondary users of a machine record becomes wider. Recognition of this problem points out the need for detailed systems study of the connection of the primary publisher and secondary user of a machine record and the role of each. An approach to this systems study is outlined which departs from the previous philosophy of this project, namely, that the secondary user publishers and information centers should be responsible for the content of the machine record. (Author)

PB-173 127 **Field 5B**
CFSTI Pries: HC$4.60 MF$0.50
American Institutes for Research, Silver Spring, Md.
A FEASIBILITY STUDY OF THE FACTOR ANALYSIS OF SCIENTIFIC JOURNAL LITERATURE.
Final rept.,
by Albert Zavala, and Harold P. Van Cott. Jul 66, 42p AIR-E-92-7/66-FR
Grant NSF-GN-496
Rept. on NSF Scientific Documentation Project.

Descriptors: (*Factor analysis, *Periodicals), Classification, Physics, Abstracts, Feasibility studies.

In order to test the feasibility of using factor analysis to examine journal literature, 74 physics journals' abstracts were tabulated under two separate category schemes, one consisting of 78 specific categories and the other consisting of 22 logical groupings of these 78 categories. From these data, three tables of intercorrelations were obtained, one giving the correlations among the 78 specific categories, another giving the correlations among the 74 journals, and the third giving the correlations among the 22 logically grouped categories. A principal components factor analysis, with varimax rotations was performed on each of the three correlation matrices. Some of the resulting factors were interpreted as representing groups of specific subject areas, while others represented general subject areas. Groupings of journals were also of two kinds, specific and general. (Author)

PB-173 128 **Field 5B, 5J**
CFSTI Prices: HC$10.60 MF$0.75
System Development Corp., Santa Monica, Calif.
EXPERIMENTAL INVESTIGATIONS OF A METHOD FOR ANALYZING DOCUMENT REPRESENTATION.
Progress rept.
9 Aug 66, 103p TM-3090
Grant NSF-GN-408
Rept. on NSF Scientific Documentation Project.

Descriptors: (*Search theory, Information retrieval), (*Subject indexing, *Reports), Classification, Cataloging, Information theory, Psychometrics, Correlation techniques, Documentation.

Identifiers: PCM.

A question of long-standing interest is how to determine which of several alternative approaches to document representation will be the most effective for a given operational context. In this connection, a new method for analyzing the judgmental bases of document representation techniques was devised. Called the Pattern Congruity Method, it dispenses with mechanical-type matching searches as well as with an embedding set of document representations, and allows separate analyses of different elements of the human judgment processes involved in document searching. The method was tested experimentally, using three different kinds of topical content in journal articles, and manipulating six different independent variables. The method was found to produce sensitive, stable results that lent themselves to interpretation, and that served to generate additional new

hypotheses for future testing. It is concluded that the method has potential as a tool for research in documentation and information retrieval. (Author)

PB-173 196 **Field 5B**
CFSTI Prices: HC$7.00 MF$1.75
Cornell Univ., Ithaca, N. Y. Dept. of Computer Science.
INFORMATION STORAGE AND RETRIEVAL.
Scientific rept.,
by Gerard Salton. Jun 66, 399p ISR-11
Rept. on NSF Scientific Documentation Project.

Descriptors: (*Information retrieval, Scientific research), (*Data storage systems, Scientific research), Design, Search theory, Automatic, Computers.

Identifiers: SMART system.

PB-173 218 **Field 5B**
CFSTI Prices: HC$4.60 MF$0.50
Lehigh Univ., Bethlehem, Pa. Center for the Information Sciences.
EXPERIMENTAL RETRIEVAL SYSTEMS STUDIES. REPORT NO. 1. MAGNETIC TAPE AND DISC FILE ORGANIZATIONS FOR RETRIEVAL,
by Robert M. Curtice. Jul 66, 50p
Grant NSF-GE-2569

Descriptors: (*Information retrieval, *Data storage systems), Magnetic tape, Disks.

General considerations involved in the design of file organizations for information retrieval systems are discussed. The question of inverted file and serial file searching on magnetic tape is reviewed. Based on formulas concerning index term usage, it is shown for a specific collection that searching the serial file is more efficient than searching the inverted file. This result is then generalized to large collections. Two existing file organizations serve as illustrations. Disc storage devices are discussed, together with disc organization of specific files. It is concluded that the use of an inverted file scheme is most applicable on a disc. (Author)

AD-639 761 **See Field 6E**

PB-173 129 **See Field 9B**

5C. ECONOMICS

AD-640 173 **Field 5C, 5A**
Not available from CFSTI.
Hawaii Univ., Honolulu. Social Science Research Inst.
CONCESSION-MAKING IN EXPERIMENTAL CONDITIONS,
by Otomar J. Bartos. 1962, 15p SSRI Reprint-6-1966
Grant AF-AFOSR-62-314
Proj. AF-9779
Task 977902
AFOSR-66-1145
Availability: Published in General Systems p145-56 1965.

Descriptors: (*Bargaining, Decision theory), Personnel management, Decision making.

Perhaps due to the prominence that negotiation has gained as a means for settling international and labor-management conflicts, an interest in negotiation has been growing within several disciplines. Numbers of models of bargaining and arbitration have been formulated by authors trained in economics and mathematics; case studies of the actual negotiation process have been made by sociologists, psychologists, and political scientists; and experiments in bargaining and negotiation are being conducted by behavioral scientists of various backgrounds. The accomplishments of these efforts have been many and our understanding of the negotiation process has increased considerably. Yet, curiously enough, a question that is of considerable practical importance and which has been a subject of some theoretical speculation has not been approached in a systematic fashion until recently: namely, is making concessions a good negotiation strategy, or is it better to make few if any concessions. (Author)

AD-640 300 **Field 5C, 5K, 13H**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
BIBLIOGRAPHY ON AUTOMATION AND TECHNOLOGICAL CHANGE AND STUDIES OF THE FUTURE,
by Annette Harrison. Oct 66, 25p P-3365-1

Descriptors: (*Bibliographies, *Automation), Economics, Social sciences, Employment.

The Paper comprises a list of works collected for two ongoing RAND projects: Automation and Technological Change, and a related informal study of future national and international problems.

AD-640 443 **Field 5C**
Not available from CFSTI.
RAND Corp., Santa Monica, Calif.
INTERNATIONAL COMMODITY AGREEMENTS: BONANZA OR ILLUSION,
by John A. Pincus. Sep 66, 18p P-3457
Availability: Hard copy available from The Rand Corporation, Santa Monica, Calif. $1.00.

Descriptors: (*Commerce, Law), Production, Costs, Economics, Stabilization, Control, Government (Foreign).

The experience of the past five years makes it increasingly clear that no panacea will emerge. Each of the four elements -- price objectives, higher productivity, trade liberalization, and balance-of-payments compensation -- should play a part in a long run adjustment effort for the nearly two billion people whose livelihood now depends on commodity production. As long as the economic welfare of most people depends on markets for food and raw materials, the commodity problem will remain in the center stage of the world's political economy. (Author)

AD-640 478 **Field 5C, 12B**
CFSTI Prices: HC$4.00 MF$1.00
Carnegie Inst. of Tech., Pittsburgh, Pa. Graduate School of Industrial Administration.
ECONOMIC PROGRAMMING AND THE VON NEUMANN MODEL: SOME PLANNING TECHNIQUES.
Management sciences research rept.,
by Roman L. Weil Jr, Gerald L. Thompson, and Michael J. Hamburger. Jun 66, 149p MSRR-78
Contract Nonr-760 (24)
Proj. NR-047-048
Doctoral thesis.

Descriptors: (*Economics, *Mathematical models), (*Linear programming, Economics), Game theory, Algorithms, Graphics, Consumption, Management planning.

Identifiers: Theses.

The essays are concerned with generalizations, extensions, and applications of the von Neumann model. The essays all have in common a 'how to' approach: Chapter II shows how to decompose a von Neumann model or an input-output model and how von Neumann expansion rates can be easily found once the decomposition is known; Chapter III shows how to find the von Neumann path and expansion rate; Chapter IV shows how to get onto the von Neumann path on an optimal way given a fixed-time constraint; and Chapter V shows how to introduce consumption into the closed von Neumann model or at least one way of attempting to do so. (Author)

N66-27753 **Field 5C**
CFSTI Prices HC$2.00 MF$0.50
Washington Univ., St. Louis, Mo. Dept. Of Economics.
PROGRAM BUDGETING - APPLYING ECONOMIC ANALYSIS TO GOVERNMENT EXPENDITURE DECISIONS.
by M. L. Weidenbaum. Apr 66, 29p NASA-CR-75492
Grant NSG-342
Its Paper No. 6602

Descriptors: *Budget, *Economics, *Program management, Analysis, Cost, Decision, Expenditure, Finance, Government, Management, Planning, System, Theory.

For abstract, see S 04 15.

N66-35769 **Field 5C**
CFSTI Prices HC$2.00 MF$0.50
Washington Univ., St. Louis, Mo. Dept. Of Economics.
STARTING SALARIES OF ENGINEERS AND SCIENTISTS.
by H. Folk. Aug 66, 28p NASA-CR-77677
Grant NSG-342
Its Working Paper 6606

Descriptors: *Economics, *Scientist, Change, Demand, Education, Income, Industry, Labor, Manpower, Market, Nasa program, Pattern, Post, Private, Structure, Warfare.

For abstract, see S 04 21.

N66-35961 **Field 5C**
CFSTI Prices HC$3.00 MF$1.00
George Washington Univ., Washington, D. C.
AN INVESTIGATION OF PROFIT RATES IN DEFENSE CONTRACTING.
by K. A. Arbogast, C. E. Bradley, P. R. Huntley, and C. C. Mc cuistion. 1966, 132p NASA-CR-77868
Grant NSG-425

Descriptors: *Contract, *Defense, *Economics, Behavior, Cost, Finance, Industry, Management, Nasa program, Rate.

For abstract, see S 04 21.

N66-36079 **Field 5C**
CFSTI Prices HC$5.00 MF$0.75
Washington Univ., St. Louis, Mo. Dept. Of Economics.
FEDERAL GOVERNMENT BUDGET TRENDS, 1965-1975.
by M. L. Weidenbaum. Aug 66, 72p NASA-CR-77751
Grant NSG-342
Its Working Paper 6605

Descriptors: *Budget, *Economics, Estimation, Finance, Government, Prediction, Program, Projection, Space, Trend.

For abstract, see S 04 21.

PB-173 198 **Field 5C**
CFSTI Prices: HC$5.00 MF$1.00
International Customs Tariffs Bureau, Brussels (Belgium).
ECUADOR.
14th ed. Year 1966-1967.
Jun 66, 158p
International Customs Journal Bull-59.

Descriptors: (*Ecuador, Economics).

Identifiers: Tariffs.

PB-173 253 **Field 5C**
CFSTI Prices: HC$1.00 MF$0.50
International Customs Tariffs Bureau, Brussels (Belgium).
RWANDA (REPUBLIC OF).
1st ed.
30 Aug 65, 8p

Pub. as Suppl. to International Customs Journal Bull-37.

Descriptors: (*Subsaharan Africa, *Commerce).

Identifiers: Rwanda, Tariffs.

PB-173 256 **Field 5C**
CFSTI Prices: HC$1.00 MF$0.50
International Customs Tariffs Bureau, Brussels (Belgium).
UNITED ARAB REPUBLIC.
1st ed.
1965, 2p
Pub. as suppl. to International Customs Journal Bull-36.

Descriptors: (*United Arab Republic, *Commerce).

Identifiers: Tariffs.

PB-173 292 **Field 5C**
CFSTI Prices: HC$4.00 MF$0.75
International Customs Tariffs Bureau, Brussels (Belgium).
PANAMA.
7th ed., Year 1958-1959.
Nov 58, 115p
Pub. as International Customs Journal Bull. no. 170.

Descriptors: (*Panama, *Commerce).

Identifiers: Tariffs.

PB-173 293 **Field 5C**
CFSTI Prices: HC$5.00 MF$1.00
International Customs Tariffs Bureau, Brussels (Belgium).
ISRAEL.
5th ed., Year 1962-1963.
Dec 62, 181p
Pub. as International Customs Journal Bull-41.

Descriptors: (*Israel, Economics).

Identifiers: Tariffs.

PB-173 294 **Field 5C**
CFSTI Prices: HC$6.00 MF$1.50
International Customs Tariffs Bureau, Brussels (Belgium).
FRANCE.
11th ed., Year 1962-1963.
Mar 63, 298p
Pub. as International Customs Journal Bull-22. Suppl. 1 to Bull-22 included.

Descriptors: (*France, Economics).

Identifiers: Tariffs.

PB-173 295 **Field 5C**
CFSTI Prices: HC$4.00 MF$0.75
International Customs Tariffs Bureau, Brussels (Belgium).
PAKISTAN.
4th ed., Year 1960-1961.
Feb 61, 125p
Pub. as International Customs Journal Bull-44.

Descriptors: (*Pakistan, *Commerce).

Identifiers: Tariffs.

PB-173 296 **Field 5C**
CFSTI Prices: HC$4.00 MF$0.75
International Customs Tariffs Bureau, Brussels (Belgium).
REPUBLIC OF THE PHILIPPINES.
6th ed., Year 1958-1959.
Jul 58, 114p
Pub. as International Customs Journal Bull-43 Suppl. to Bull-43 also included.

Descriptors: (*Philippines, *Commerce).

Identifiers: Tariffs.

PB-173 297 **Field 5C**
CFSTI Prices: HC$4.00 MF$1.00
International Customs Tariffs Bureau, Brussels (Belgium).
TURKEY.
8th ed., Year 1961-1962.
Jun 61, 131p
Pub. as International Customs Journal Bull-133. 1st Suppl. to Bull-133 also included.

Descriptors: (*Turkey, *Commerce).

Identifiers: Tariffs.

PB-173 298 **Field 5C**
CFSTI Prices: HC$5.00 MF$1.00
International Customs Tariffs Bureau, Brussels (Belgium).
CHILE.
10th ed., Year 1954-1955.
Sep 54, 162p
Pub. as International Customs Journal Bull-150. Suppls. to Bull-150 also included (1-4).

Descriptors: (*Chile, *Commerce).

Identifiers: Tariffs.

PB-173 299 **Field 5C**
CFSTI Prices: HC$3.00 MF$0.75
International Customs Tariffs Bureau, Brussels (Belgium).
PARAGUAY.
5th ed., Year 1949-1950.
Jul 49, 92p
Pub. as International Customs Journal Bull. no. 123.

Descriptors: (*South America, *Commerce).

Identifiers: Paraguay.

PB-173 300 **Field 5C**
CFSTI Prices: HC$1.00 MF$0.50
International Customs Tariffs Bureau, Brussels (Belgium).
HONG KONG.
5th ed., Year 1960-1961.
May 60, 5p
Pub. as International Customs Journal Bull. no. 183.

Descriptors: (*Hong Kong, *Commerce).

Identifiers: Tariffs.

PB-173 301 **Field 5C**
CFSTI Prices: HC$4.00 MF$1.00
International Customs Tariffs Bureau, Brussels (Belgium).
LEBANON.
2nd ed., Year 1961-1962.
Aug 61, 139p
Pub. as International Customs Journal Bull-49. Suppls. 1 and 2 to Bull-49 also included.

Descriptors: (*Lebanon, *Commerce).

Identifiers: Tariffs.

PB-173 302 **Field 5C**
CFSTI Prices: HC$5.00 MF$1.00
International Customs Tariffs Bureau, Brussels (Belgium).
VENEZUELA.
18thed., Year 1960-1961.
Nov 60, 171p
Pub. as International Customs Journal Bull-30. Suppl. 1 to Bull-30 included.

Descriptors: (*Venezuela, *Commerce).

Identifiers: Tariffs.

PB-173 303 **Field 5C**
CFSTI Prices: HC$5.00 MF$1.00
International Customs Tariffs Bureau, Brussels (Belgium).
BRAZIL.
8th ed., Year 1957-1958.
Mar 58, 190p
Pub. as International Customs Journal Bull-6.

Descriptors: (*Brazil, *Commerce).

Identifiers: Tariffs.

PB-173 304 **Field 5C**
CFSTI Prices: HC$6.00 MF$1.25
International Customs Tariffs Bureau, Brussels (Belgium).
NEW ZEALAND.
9th ed., Year 1963-1964.
Jun 63, 231p
Pub. as International Customs Journal Bull-29 Suppl. 1 to Bull-29 also included.

Descriptors: (*New Zealand, *Commerce).

Identifiers: Tariffs.

PB-173 305 **Field 5C**
CFSTI Prices: HC$4.00 MF$0.75
International Customs Tariffs Bureau, Brussels (Belgium).
IRAQ.
2nd ed., Year 1957-1958.
Jul 57, 107p
Pub. as International Customs Journal Bull-34.

Descriptors: (*Iraq, *Commerce).

Identifiers: Tariffs.

PB-173 306 **Field 5C**
CFSTI Prices: HC$4.00 MF$0.75
International Customs Tariffs Bureau, Brussels (Belgium).
THAILAND.
9th ed., Year 1960-1961.
Jan 61, 108p
Pub. as International Customs Journal Bull. no. 145.

Descriptors: (*Thailand, *Commerce).

Identifiers: Tariffs.

PB-173 307 **Field 5C**
CFSTI Prices: HC$3.00 MF$0.75
International Customs Tariffs Bureau, Brussels (Belgium).
IRAN.
8th ed., Year 1960-1961.
Sep 60, 81p
Pub. as International Customs Journal Bull. no. 138.

Descriptors: (*Iran, *Commerce).

Identifiers: Tariffs.

PB-173 316 **Field 5C**
CFSTI Prices: HC$5.00 MF$1.00
International Customs Tariffs Bureau, Brussels (Belgium).
SOCIALIST FEDERATIVE REPUBLIC OF YUGOSLAVIA.
1st ed., Year 1966-1967.
Jun 66, 182p
Pub. as International Customs Journal Bull-35.

Descriptors: (*Yugoslavia, *Economics), (*Commerce, Yugoslavia).

Identifiers: Tariffs.

PB-173 317 **Field 5C**
CFSTI Prices: HC$4.00 MF$0.75
International Customs Tariffs Bureau, Brussels (Belgium).
GAMBIA.
9th ed., Year 1966-1967.
Jul 66, 105p
Pub. as International Customs Journal Bull-75.

Descriptors: (*Subsaharan Africa, *Economics), (*Commerce, Subsaharan Africa), Africa.

Identifiers: Tariffs, Gambia.

AD-639 713 **See Field 15C**

AD-639 837 **See Field 9B**

PB-173 019 **See Field 5A**

PB-173 207 **See Field 5A**

PB-173 208 **See Field 5A**

5D. HISTORY, LAW, and POLITICAL SCIENCE

AD-639 732 **Field 5D, 15E**
CFSTI Prices: HC$3.00 MF$0.75
RAND Corp., Santa Monica, Calif.
PROPRIETARY RIGHTS AND COMPETITION IN PROCUREMENT,
by James W. McKie. Jun 66, 81p RM-5038-PR
Contract AF 41 (638)-1700

Descriptors: (*Government procurement, *Law), Bargaining, Economics, Industrial procurement.

Identifiers: Proprietary rights, Contracts.

The problem is considered of private ownership of nonpatentable technical rights and its effect on the Government's effort to enlarge the scope of competition in procurement. Under the Government's present policy it is difficult to determine specifically which data are developed at private expense; thus there is danger of confiscation of private data under R and D contracts, or of overpayment for private data. Alternative policies are that rights could be ignored, lump-sum payments for rights might be made, or licenses might be used. Under a suggested compromise policy, the Government might be satisfied if contractors would supply complete form, fit, and function data as well as Government-financed R and D data. The Government would only acquire detailed manufacturing data on internal components of items procured as units when the processes and designs were developed at Government expense. If a transfer of private processing information were necessary, the Government could arrange a licensing agreement, including fees and royalties commensurate with the values given up by the licensor. (Author)

AD-640 442 **See Field 5A**

AD-640 504 **See Field 9B**

5E. HUMAN FACTORS ENGINEERING

AD-466 961 **Field 5E, 5H**
CFSTI Prices: HC$2.00 MF$0.50
Douglas Aircraft Co., Inc., El Segundo, Calif.
AN INTRODUCTION TO THE SPECIFICATION OF OPTIMUM VISUAL DISPLAY DESIGN CHARACTERISTICS,
by L. G. Summers. 30 Jun 61, 29p ES-40408
Contract Nonr-1076 (00)

Descriptors: (*Display systems, Design), Visual perception, Optimization, Specifications, Human engineering.

The characteristics of an optimum visual display without any definition of the material presented on the display and without any physical limits for the display can be defined in terms of the maximum amount of information that is capable of being presented to the human subject at any one time. The following chart lists the estimated optimum values for the different display characteristics. (Author)

AD-639 854 **Field 5E, 5H, 5J**
CFSTI Prices: HC$1.60 MF$0.50
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
SOME PERCEPTUAL PROBLEMS IN THE DESIGN OF CODED SWITCHING KEYBOARDS.
Technical rept.,
by J. W. Gebhard, and R. W. Glickman. 10 Oct 51, 19p
Contract N5ori-166 (01)
Projs. NR-784-001, 20-F-1
SPECDEVCEN-166-1-126

Descriptors: (*Display systems, Human engineering), (*Visual perception, Display systems), Operators (Personnel).

Identifiers: Keyboards.

Conclusions: It is possible and desirable to design a key that allows for clear, accurate recognition as a unit. This key, at the same time, will make a meaningful pattern when used with other keys. Keyboard display systems make possible rapid, accurate decisions in simple, direct control situations involving the assignment of columns to rows. Time for making simple, direct assignment decisions increases slowly with the number of elements in the keyboard. The largest size keyboards studied (120 keys) took less than 0.5 seconds longer to operate, on the average, than the smallest (36 keys). When columns are assigned to rows, increasing the number of columns does not affect time of operation as much as increasing the number of rows. Complex assignments on a keyboard display take much more time than do simple assignments. The amount of time required to solve assignment problems is proportional to the number of visual search operations required to hunt down the solution. (Author)

AD-639 862 **Field 5E, 9A, 20F**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
VISIBILITY ON CATHODE-RAY TUBE SCREENS: INTENSITY AND COLOR OF AMBIENT ILLUMINATION,
by S. B. Williams, and R. M. Hanes. 26 Oct 48, 14p
Contract N5-ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-I-56
Availability: Published in The Journal of Psychology v27 p231-44 1949.

Descriptors: (*Visibility, *Cathode ray tube screens), Radar equipment, Plan position indicators, Intensity, Colors, Illumination.

An experiment was carried out to determine the effect of the intensity and color of ambient illumination on the visibility of a small signal pip on a typical radar scope of the intensity modulated type. Intensity of ambient light was found to be critical. It was impossible to exceed by more than a half log unit the brightness of the viewing screen without reducing visibility. On the other hand, complete darkness is also unfavorable. At low illumination levels color is insignificant. At the higher levels where visibility becomes impaired, the impairment is less for blue and green than for amber, red, mazda, and 'daylight'. Comparison of these results with those in the visual literature suggests no obvious explanation for the color differences. There is some possibility that the effect may not be visual at all but rather a consequence of the direct stimulation of the phosphor screen by the ambient light. (Author)

AD-639 863 **Field 5E, 9A, 20F**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md.
VISIBILITY OF CATHODE-RAY TUBE SCREENS. THE EFFECT OF SIZE AND SHAPE OF PIP,
by N. R. Bartlett, S. B. Williams, and R. M. Hanes. 11 Feb 49, 4p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-57
Availability: Published in Journal of the Optical Society of America v39 n6 p463-70 Jun 1949.

Descriptors: (*Visibility, *Cathode ray tube screens), Radar equipment, Plan position indicators, Radar signals, Configuration.

The area and contour of a stimulus have been indicated experimentally as factors in its visibility. In order to evaluate the role of such factors in radar presentation, an experiment was conducted to determine the effect upon visibility of changes in the size and shape of a radar pip. A wide range of beam widths (which determine the angular dimension of the pip) and pulse lengths (which determine its radial dimension) was investigated at each of three test field brightnesses. Results show that visibility, on a decibel scale, is a linear function of the logarithm of beam width at each of the three brightness levels used. For the dim background visibility is also a linear function of the logarithm of pulse length. For the brighter backgrounds, on the other hand, visibility is shown to be a curvilinear function of the logarithm of pulse length. It is suggested that the reason for the difference between an increase in beam width and an increase in pulse length lies in the time factor. Doubling the beam width, for example, results in a greater increase in the time during which the pip is exposed to the eye than does a corresponding increase in the pulse length. (Author)

AD-639 865 **Field 5E, 9A, 20F**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
VISIBILITY ON CATHODE-RAY TUBE SCREENS: SIGNALS ON A P-7 SCREEN EXPOSED FOR DIFFERENT INTERVALS.,
by N. R. Bartlett, and A. L. Sweet. 25 Feb 49, 4p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-I-83
Availability: Published in Journal of the Optical Society of America v39 n6 p470-3 Jun 1949.

Descriptors: (*Visibility, *Cathode ray tube screens), Plan position indicators, Human engineering, Radar equipment.

Empirical data for the minimum signal voltage for a pip on a P-7 radar screen have been described as a function of the exposure time of the pip. This has been done for two bias levels for the CRT-a dim scope and a bright scope. From the measurements it is concluded that there is a more marked gain in visibility with increased exposure time for the bright screen than for the dim one, but that on the bright screen visibility probably approaches its maximum at a shorter exposure time. Two turning rates for the sweep were used. And it may be concluded that, for any exposure time or for either brightness of screen (CRT bias) the slower turning rate yields improved signal detection. (Author)

AD-639 866 **Field 5E, 5H**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
MACHINE DIALS AND SCALES,
by W. R. Garner, and J. W. Gebhard. 1949, 9p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-I-86
Availability: Published in Machine Design p2-9 Aug 1949.

Descriptors: (*Instrument dials, Human engineering), (*Scale, Human engineering), Design, Numbers, Visual perception.

AD-639 906 **Field 5E**
CFSTI Prices: HC$19.40 MF$6.25
Tufts Univ., Medford, Mass. Inst. for Psychological Research.
HUMAN FACTORS ENGINEERING BIBLIOGRAPHIC SERIES. VOLUME 1. 1940-1959 LITERATURE,
by Paul G. Ronco. May 66, 1642p
Contracts DA-18-001-AMC-1004 (X), Nonr-494 (13)
APG-HEL-Bib-Vol-1

Descriptors: (*Human engineering, Bibliographies), Indexes, Abstracts.

The bibliography is the first in a planned series of bibliographies of literature pertinent to the field of human factors engineering. It covers literature from the time period of 1940 through 1959. The bibliography consists primarily of: (1) an index to the human factors literature, and (2) the annotated bibliography. (Author)

AD-639 966 **Field 5E, 9A**
Not available from CFSTI.
Defence Research Medical Labs., Toronto (Ontario). Sensory Capacities Section.
THE SIGNIFICANCE OF VARIANCES IN THE REAL-EAR SENSITIVITY OF A CIRCUMAURAL EARPHONE,
by S. E. Forshaw. 8 Feb 66, 6p
DRML-RP-625
Availability: Published in Journal Sound Vibration v4 n1 p45-50 1966.

Descriptors: (*Earphones, Acoustic impedance), Ear, Sensitivity, Human engineering, Audiofrequency, Analysis of variance, Canada.

The variations in the real-ear sensitivity of a circumaural earphone due to individual differences in the acoustical impedance of the ear were determined. The results indicated that between-subject variances were significant in the one-third octave bands between 800 and 2500 c/s. At higher frequencies the experimental error of the measurements increased so that between-subject variances, although larger than the mid-frequency values, were not statistically significant. (Author)

AD-640 076 **Field 5E**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
APPRAISAL OF DEVELOPMENT MODELS OF SIXTY-INCH VERTICAL PLOTTING BOARDS.
20 Jan 49, 8p
SPECDEVCEN-166-1-80

Descriptors: (*Plotting boards, Design), Human engineering, Direction finding, Range finding, Performance tests, Effectiveness.

The report states the results of tests made on two vertical plotting boards, with appraisal of other features of the board than maximum speed and accuracy of plotting and reading of target positions. The report also includes one design for the grid overlay of the vertical plotting board which incorporates the best features of the old design and the two proposed designs. (Author)

AD-640 087 **Field 5E, 9A, 20F**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md.
VISIBILITY ON CATHODE-RAY TUBE SCREENS: VIEWING ANGLE,
by Stanley B. Williams. 23 May 49, 4p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-92
Availability: Published in Journal of the Optical Society of America v39 n9 p782-5 Sep 1949.

Descriptors: (*Visibility, *Cathode ray tube screens), Radar equipment, Display systems, Plan position indicators, Thresholds (Physiology).

Thresholds of visual detectability were determined for signals on a modified 7BP7 cathode-ray tube. Thresholds were determined in units of signal voltage for three pip sizes, all relatively small, and for four screen brightnesses at each of several positions from the line of binocular regard to 20 degrees out from it. The purpose was to determine the limits within which chance eccentricity of view could be a factor in radar detection. The range of impairment from zero to twenty degrees of eccentricity was about 17 db of signal voltage. The course of the impairment is probably not quite linear with the optimal scope brightness (about 0.16 footlambert for this phosphor), but the slope is a function of scope brightness. For very small pips. the data show no region of equal visibility, even within the fovea; direct fixation is required for maximal detection. There being no data based on optically precise stimuli available for comparison with the radar thresholds, an estimate was made of the luminances of the pips and their backgrounds. As estimated, the visual threshold probably varies up to one-log unit or greater over a range of 20 degrees of viewing angle, for the optimal scope background. (Author)

AD-640 090 **Field 5E, 9A, 20F**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Dept. of Psychology.
VISIBILITY OF CATHODE-RAY TUBE SCREENS: SEARCH TIME AS A FUNCTION OF SIGNAL STRENGTH,
by M. W. Harriman. 11 Nov 49, 4p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-101
Availability: Published in The Journal of Psychology v29 p247-50 1950.

Descriptors: (*Visibility, *Cathode ray tube screens), Radar equipment, Display systems, Plan position indicators, Search theory.

Visual search time on the radar scope was studied as a function of signal strength. Search time in seconds was obtained from three subjects for eight signal voltages--0, 2, 4, 6, 8, 10, 12, and 14 db above threshold. The target was a small pip, 1/2 microsecond pulse length and one degree beam width, giving an angular subtense of approximately 3 ft 31 in. in its radial dimension at a viewing distances of 12 inches. Results show the relationship between search time and signal voltage to be logarithmic. Targets 12 and 14 db threshold were located, on the average, in 2.7 seconds, the minimum search time under the conditions of the experiment. Pips at threshold and two db above were not located, on the average, within a 120-second time allowance. (Author)

AD-640 092 **Field 5E, 9A, 20F**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
VISIBILITY ON CATHODE-RAY TUBE SCREENS: POSITIVE VS. NEGATIVE SIGNALS ON AN INTENSITY MODULATED SCOPE,
by M. W. Harriman, and S. B. Williams. Oct 49, 3p
Contract N5Ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-102
Availability: Published in Journal of the Optical Society of America v40 n2 p102-4 Feb 1950.

Descriptors: (*Visibility, *Cathode ray tube screens), Radar equipment, Display systems, Plan position indicators, Target recognition.

The paper compares two methods of presenting targets on CRT screens of modern radar. One method makes use of grid targets (positive signals) which appear brighter than their background, and the other employs cathode targets (negative signals) which appear darker than their background. Data were collected from three subjects on a very small target and on one of moderate size. A third target, intermediate in area, was studied, but in less detail. The results show: (1) The visibility of a cathode target is better than that of a grid target at bias levels which are relatively bright. The amount by which cathode targets are more visible is from 1 to 9 db. (2) There is evidence that the dimmest bias at which the cathode target is superior to the grid target is a function of the size of the target. (3) The optimal bias for a very small target is shifted to a brighter level by about a volt and a half when target voltage is injected at the cathode. (4) The superiority of the cathode target is due, not to any inherent advantage of dark-on-light targets, but rather to a property of the phosphor which allows the phosphor to work on a portion of its response curve favorable to human vision. (Author)

AD-640 093 **Field 5E**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md.
LEGIBILITY OF NUMERALS: THE OPTIMAL RATIO OF HEIGHT TO WIDTH OF STROKE,
by James E. Kuntz, and Robert B. Sleight. 18 Apr 50, 9p
Contract N5ori-166 (01)
Proj. NR-166-1-106
SPECDEVCEN-166-1-106
Prepared in cooperation with Tulsa Univ., Okla. and Purdue Univ., Lafayette, Ind. Applied Psychology Lab.
Availability: Published in The American Journal of Psychology v63 n4 p567-75 Oct 1950.

Descriptors: (*Human engineering, Numbers), (*Numbers, Display systems), Brightness, Background, Visibility, Visual signals, Measurement, Analysis of variance.

Identifiers: Legibility.

A study was made with numerals of varying height and stroke-width read at various distances, in order to determine the ratio yielding highest legibility. Effects of brightness and background on legibility were likewise studied. The following conclusions seem to be warranted: (1) Using a midstroke-height measurement for the numerals made with a modified LeRoy Lettering Set, the optimal height vs. stroke-width ratio (H/s.w.) is between 6.0:1 and 4.0:1, or, more precisely stated, at 5.0:1. (2) The optimal ratio is approximately the same for numeral brightnesses of 3.0, 10.0, and 31.0 footlamberts. (3) The several numerals used show clear differences in legibility. They rank from most to least legible in the order 1,7,0,4,3,2,9,6,5,8 indicating a need for modification in the form of certain numerals in order to improve the legibility of those of low rank. (4) Legibility of black numerals on white background and that of white numerals on black background is the same under the conditions of this experiment. (Author)

AD-640 155 **Field 5E, 11C, 19C**
CFSTI Prices: HC$2.00 MF$0.50
Human Engineering Labs., Aberdeen Proving Ground, Md.
CREW-COMPARTMENT TEMPERATUES: THE EFFECTS OF A SOLAR-HEAT REFLECTING PAINT.
Technical note,
by R. Bradley Randall. Jul 66, 43p TN-4-66

Descriptors: (*Human engineering, Armored vehicles), (*Paints, Thermal properties), (*Thermal insulation, Paints), Solar radiation, Temperature, Heat tolerance, Effectiveness, Army personnel.

The study evaluated on olive-drab enamel that reflects solar heat. The evaluation compared temperatures inside two M113 Armored Personnel Carriers (APCs): one painted with the reflecting paint

and the other with a conventional lusterless olive-drab finish. Over a five-day period, measurements at five locations on each APC revealed that temperatures were lower in the vehicle treated with the reflecting paint. Because this paint reduces the temperature of the vehicular skin and of the crew-compartment air, it will probably reduce the thermal stress on personnel confined inside such vehicles. If this paint is used with air-conditioned vehicles, it should reduce air-conditioning requirements. (Author)

AD-640 162 **Field 5E, 15G**
CFSTI Prices: HC$1.00 MF$0.50
Human Engineering Labs., Aberdeen Proving Ground, Md.
TROOP-POSTURE SEQUENCES FOR A 155 MM HOWITZER CREW: A PILOT STUDY.
Technical note,
by Robert T. Gschwind, and James P. Torre Jr.
Aug 66, 21p TN-6-66

Descriptors: (*Army personnel, *Human engineering), (*Posture, Army personnel), Howitzers, Time, Tactical warfare.

The field study investigated an artillery crew's posture sequence under simulated artillery fire. The results relate their posture (e.g., standing or prone) to time after the initial warning. A method of analyzing the crew's exposed area is presented. Conclusions: If troops have even a few seconds of warning, they can improve their defensive postures greatly. When prepared foxholes are available, defensive posture will be quite different with four seconds' warning than with two seconds' warning. (Author)

AD-640 170 **Field 5E, 5H, 17B**
CFSTI Prices: HC$2.00 MF$0.50
Mitre Corp., Bedford, Mass.
STUDIES OF DISPLAY SYMBOL LEGIBILITY. PART X. THE RELATIVE LEGIBILITY OF LEROY AND LINCOLN/MITRE ALPHANUMERIC SYMBOLS.
by Diana J. Showman. Aug 66, 31p MTR-204
Contract AF 19 (628)-5165
Proj. AF-7030
ESD-TR-66-115

Descriptors: (*Display systems, *Numbers), (*Human engineering, Display systems), Brightness, Target discrimination, Performance (Human).

Identifiers: Legibility.

The legibility of standard Leroy alphanumeric symbols was compared with a new font, the Lincoln/MITRE (L/M) font. Legibility was tested by having human subjects attempt to identify the symbols when seen one at a time for a brief exposure period. The results showed the L/M font to be more legible than the standard Leroy. It is recommended that the two fonts be compared in a similar test on a TV monitor; this study is presently being conducted. (Author)

AD-640 469 **Field 5E, 13J**
CFSTI Prices: HC$1.00 MF$0.50
Naval Submarine Medical Center, Groton, Conn. Medical Research Lab.
LIGHTING SURVEY OF U. S. S. SUNBIRD (ASR-15).
Memorandum rept.,
by Jo Ann S. Kinney. 26 Aug 63, 5p MR-63-11
NAVMED-MR005.14-1100-1.14

Descriptors: (*Submarines, *Illumination), Naval vessels (Support), Specifications, Human engineering.

Identifiers: ASR 15.

A lighting survey was made in the living spaces aboard the U.S.S. SUNBIRD (ASR-15) to determine the adequacy of existing illumination. The general findings of the lighting survey indicate that the lighting is substandard. Specific recommendations are made for improvement. The report outlines the specific changes that should be made to bring the existing illumination in the living areas up to suggested minima. (Author)

AD-639 750 **See Field 5H**

AD-639 855 **See Field 5J**

AD-640 040 **See Field 5J**

AD-640 041 **See Field 5J**

AD-640 042 **See Field 5J**

AD-640 075 **See Field 17I**

AD-640 077 **See Field 5J**

AD-640 079 **See Field 17I**

AD-640 080 **See Field 17I**

AD-640 448 **See Field 13J**

PB-173 312 **See Field 13F**

PB-173 313 **See Field 13F**

5F. HUMANITIES

LA-3520 **Field 5F**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
THE CURRENT STATUS OF ARCHEOLOGY AT THE NEVADA TEST SITE AND THE NUCLEAR ROCKET DEVELOPMENT STATION,
by F. C. V. Worman. May 66, 30p
Contract W-7405-eng-36

Descriptors: (*Archaeology, Nevada).

For abstract, see N 20 19.

5G. LINGUISTICS

AD-640 234 **Field 5G, 8F, 8B**
CFSTI Prices: HC$1.00 MF$0.50
Dept. of the Army, Washington, D. C.
GENERICS YAVR, YAGR, YAKHR (LAKE) FOUND IN THE NORTHERN PART OF RUSSIA (THE USE OF PHYSICAL GEOGRAPHY DATA IN TOPONYMIC RESEARCH),
by A. K. Mateev. 25 Aug 66, 6p 1-9979
TT-66-62417
Toponimicheskie Elementy Yavr, Yakhr, Yagr (Ozero) na Russkom Severe (K Voprosu ob Ispolzovaii Dannykh Fizicheskoi Geografii v Toponimicheskikh Issledovaniyakh, trans. of Akademiya Nauk SSSR. Izvestiya. Seriya Geograficheskaya n6 p17-22 1965.

Descriptors: (*Geography, *Linguistics), Lakes, Mapping, USSR.

Identifiers: Toponymics, Finno-Ugric Languages.

The article is intended to study the pre-Russian typonyms with the meaning 'lake', encountered in abundance as would be expected, in the Russian North, and which characterize the substrata of the Finn-Ugric bases 'Yavr', 'Yagr', and 'Yakhr'. (Author)

PB-170 894 **Field 5G**
CFSTI Prices: HC$4.60 MF$0.50
Pennsylvania Univ., Philadelphia. Dept. of Linguistics.
FOUR TYPES OF NOMINALIZATIONS IN AN ENGLISH-POLISH TRANSFER GRAMMAR.
Transformations and Discourse Analysis Papers no. 62,
by Irena Bellert. 1966, 47p
Rept. on NSF Scientific documentation Project.

Descriptors: (*Transformational grammars, Analysis), English language, Poland, Language, Syntax.

Identifiers: Polish language.

PB-173 258 **Field 5G**
CFSTI Prices: HC$8.60 MF$0.75
Cambridge Language Research Unit (England).
THE CAMBRIDGE LANGUAGE RESEARCH UNIT COMPUTER PROGRAM FOR SYNTACTIC ANALYSIS,
by A. F. Parker-Rhodes, R. McKinnon Wood, M. Kay, and P. Bratley. 1965, 90p ML-136

Descriptors: (*Syntax, Analysis), English language, Programming (Computers), Great Britain.

AD-639 964 **See Field 17B**

AD-640 083 **See Field 5B**

AD-640 406 **See Field 17B**

5H. MAN-MACHINE RELATIONS

AD-468 834 **Field 5H, 14A**
CFSTI Prices: HC$2.00 MF$0.50
Naval Personnel Research Activity, San Diego, Calif.
A SELECTED ANNOTATED BIBLIOGRAPHY ON COST-EFFECTIVENESS AND MAN/MACHINE FUNCTION ALLOCATION.
Research memo.,
by J. Scott Webb. Aug 65, 40p SRM-66-4

Descriptors: (*Costs, Effectiveness), (*Systems engineering, Bibliographies), (*Bibliographies, Systems engineering), Military personnel, Personnel management, Human engineering, Automation.

The bibliography includes the references and summaries of over 100 publications pertaining to system costs, system effectiveness, cost-effectiveness ratios, and man/machine function allocation. (Author)

AD-639 750 **Field 5H, 5E, 17B**
CFSTI Prices: HC$2.00 MF$0.50
Mitre Corp., Bedford, Mass.
STUDIES IN DISPLAY SYMBOL LEGIBILITY: PART XI. THE RELATIVE LEGIBILITY OF SELECTED ALPHANUMERICS IN TWO FONTS,
by G. C. Kinney, and D. J. Showman. Aug 66, 30p
MTR-205-Pt-11
Contract AF 19 (628)-5165
Proj. AF-7030
ESD-TR-66-116
See also AD-633 055.

Descriptors: (*Display systems, Human engineering), Visual signals, Numbers, Errors, Effectiveness, Vocabulary, Television display systems.

Identifiers: Legibility.

Twelve of the most frequently confused alphanumeric symbols were selected from Leroy and Lincoln/MITRE (L/M) fonts and studied for their relative legibilities. Human subjects saw the symbols with five different brightness contrast ratios, and errors were recorded. The L/M font gave significantly fewer errors at all contrast ratios. It was concluded that the L/M font will yield better legibility than the Leroy font and that a greater reduction in errors can be obtained by using the L/M font than by increasing the contrast of a display using Leroy symbols. (Author)

N66-27533 **Field 5H**
CFSTI Prices HC$3.00 MF$0.50
Stanford Univ., Calif.
PREDICTOR AIDED TRACKING IN A SYSTEM WITH TIME DELAY - PERFORMANCE IN-

VOLVING FLAT SURFACE, ROLL, AND PITCH CONDITIONS.
by L. A. Bennigson, M. E. Kahn, and J. M. Leslie.
Mar 66, 51p NASA-CR-75399
Grant NSG-111-61

Descriptors: *Human performance, *Remote control, *Time delay, *Tracking, Aid, Control, Delay, Flat, Human, Performance, Pitch, Predictor, Remote, Roll, Simulator, Surface, Time.

For abstract, see S 04 15.

N66-29337 **Field 5H**
CFSTI Prices HC$2.00 MF$0.50
George Washington Univ., Washington, D. C.
A SURVEY OF SOME ELEMENTS IN AMERICAN TECHNOLOGY.
by C. M. Bacon. Nov 64, 45p NASA-CR-57431
Grant NSG-727
Its Ppsst Paper No. 3

Descriptors: *Technology, *United states, Acceleration, Aircraft, Government, Radar, Radio, Rocket, Television, Warfare.

For abstract, see S 04 16.

N66-29575 **Field 5H**
CFSTI Prices HC$1.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge. Engineering Projects Lab.
FUNCTIONAL EXTENSION OF THE HUMAN HANDS PROGRESS REPORT, 1 OCT. 1965 - 31 MAR. 1966.
24 Jun 66, 10p NASA-CR-75911, SA-9991-5
Grant NSG-107-61

Descriptors: *Handling equipment, *Sensor, Control, Detection, Equipment, Feedback, Hand, Handling, Manipulator, Mechanical, Remote, Sound, Visual.

For abstract, see S 04 16.

N66-29869 **Field 5H**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
SEXTANT SIGHTING PERFORMANCE IN MEASURING THE ANGLE BETWEEN A STATIONARY SIMULATED STAR AND A STATIONARY BLINKING LIGHT.
by B. A. Lampkin, E. C. Lampkin, and R. J. Randle. Jul 66, 27p NASA-TN-D-3506

Descriptors: *Human performance, *Measuring apparatus, *Sextant, *Simulation, *Space navigation, Aid, Angle, Apparatus, Human, Light, Measurement, Measuring, Navigation, Performance, Sight, Space, Space vehicle, Star, Test.

For abstract, see S 04 16.

N66-35937 **Field 5H**
CFSTI Prices HC$2.50 MF$0.75
Trw Systems, Redondo Beach, Calif.
VISUAL DETECTION OF POINT SOURCE TARGETS.
by R. A. Shea, and L. G. Summers. Sep 66, 71p NASA-CR-563
Contract NAS2-2742

Descriptors: *Point source, *Star field, *Target recognition, *Visual observation, Accuracy, Background, Field, Observation, Point, Recognition, Rendezvous, Search, Simulation, Source, Spacecraft, Star, Strategy, Target, Time, Training, Transfer, Visual.

For abstract, see S 04 21.

N66-36110 **Field 5H**
CFSTI Prices HC$3.75 MF$1.75
Serendipity Associates, Los Angeles, Calif.
A STUDY OF POTENTIAL ROLES OF SUPERSONIC TRANSPORT CREWS AND SOME IMPLICATIONS FOR THE FLIGHT DECK. VOLUME I - WORKLOAD, CREW ROLES, FLIGHT DECK CONCEPTS, AND CONCLUSIONS.
by W. J. Ereneta, W. D. Honsberger, and H. E. Price. Aug 66, 319p NASA-CR-561
Contract NAS2-2209

Descriptors: *Aircrew, *Cockpit, *Supersonic transport, Crew, Deck, Design, Flight, Instrumentation, Man-machine, Management, Planning, Requirement, Supersonic, Transport.

For abstract, see S 04 21.

AD-466 961 **See Field 5E**

AD-639 644 **See Field 1E**

AD-639 854 **See Field 5E**

AD-639 866 **See Field 5E**

AD-639 968 **See Field 20E**

AD-640 057 **See Field 15G**

AD-640 061 **See Field 17I**

AD-640 075 **See Field 17I**

AD-640 077 **See Field 5J**

AD-640 170 **See Field 5E**

AD-640 283 **See Field 5B**

5I. PERSONNEL SELECTION, TRAINING, AND EVALUATION

AD-639 714 **Field 5I, 9B**
CFSTI Prices: HC$3.00 MF$0.50
Virginia Polytechnic Inst., Blacksburg.
ANALYSIS OF COMPUTER SCIENCE CURRICULA IN AMERICAN COLLEGES AND UNIVERSITIES,
by Bruce Jay Arret, and Bruce Norman Hahn.
Aug 66, 51p
Prepared in cooperation with Maryland Univ., College Park.

Descriptors: (*Computers, *Education), Universities, Analysis, Programming (Computers), Artificial intelligence, Cybernetics, Mathematical programming.

Reactions from many colleges and universities throughout the United States indicate that the Computer Science field, as a program of guided institutional study, is in its earliest infancy. Many schools not now offering degrees have plans for programs. Schools already offering degrees are constantly changing, adding and dropping courses, and shifting scope. Comparison is difficult because of a lack of uniformity due to the newness of the science, differences in concept of the field and its objectives, communications difficulties created by the vagueness of the language, and structural problems confronting new or proposed departments making their future status unpredictable. (Author)

AD-639 755 **Field 5I**
CFSTI Prices: HC$5.00 MF$1.00
FMC Corp., Santa Clara, Calif. Central Engineering Lab.
ON SITE SIMULATION OF SOURCE DATA GENERATION.
Technical rept. 14 Jun 65-1 Jul 66,
by Bruce N. McArthur, Anne Melby, and George Reid. Aug 66, 191p
Contract AF 33 (615)-3156
Proj. AF-5581
Task 558103
ASD-TR-66-12

Descriptors: (*Personnel, Selection), Data, Simulation, Performance (Human), Psychometrics, Errors, Human engineering.

An onsite study of source data generation by operational personnel in a simulated operational environment was performed. The purposes were to measure source data error levels, determine the effects of performance feedback, goal-setting, special type font and special handprinting instructions, on source data accuracy, and develop effective criteria for personnel selection and assignment. Criteria tested for potential in personnel selection and assignment included standard and specially designed clerical aptitude tests, general intelligence tests, a nonprojective personality test, a vocational interest blank, Civil Service supervisory tests, visual acuity scores, and other human factors. A representative sample of personnel involved in source data generation on-the-job was comprised of 15 women and 33 men. Operational simulation experiments employed typical source data materials. For a reading and legibility study, computer-generated synthetic codes were used. (Author)

AD-639 757 **Field 5I**
CFSTI Prices: HC$4.00 MF$0.75
National Training Labs., Washington, D. C.
A STUDY OF THE APPLICATION OF LABORATORY TRAINING METHODS TO PROGRAMS AT AIR UNIVERSITY.
Final rept. Oct 64-Jul 65,
by Ronald K. Boyer, and Herman M. Medow. Jun 66, 105p
Grant AF-AFOSR-784-65
Proj. AF-9778
Task 977802
AFOSR-66-1931

Descriptors: (*Training, Scientific research), Management planning, Military training, Social psychology.

Over a period of one year, and under the sponsorship of the Office of Scientific Research, the National Training Laboratories, and Air University, collaborated on a project to explore applications of laboratory training methods to Air University activities. Programs at Air University were identified for which laboratory training would be particularly appropriate. An assessment was made of problems likely to be encountered in adapting laboratory training to these programs. Laboratory training designs were assessed for modifications which would be desirable to meet the specific objectives of Air University. (Author)

AD-639 868 **Field 5I, 5J, 6E**
Not available from CFSTI.
Bureau of Social Science Research, Inc., Washington, D. C.
SOME NOTES ON THE PRODUCTION OF PSYCHIATRIC AND PSYCHOLOGICAL KNOWLEDGE,
by Samuel Z. Klausner. 16 Sep 64, 14p
Contract AF 49 (638)-992
Proj. AF-9779
Task 977901
AFOSR-66-1154
Availability: Published in Journal of Consulting Psychology v29 n5 p405-14 1965.

Descriptors: (*Psychiatry, Scientific research), (*Psychology, Scientific research), Social sciences, Professional personnel, Medical personnel, Stress (Psychology), Personality, Behavior, Education, Perception (Psychology).

The polemic about the relative competencies of psychiatrists and psychologists has, by and large, concerned their clinical roles. Members of these two professions differ in types of knowledge they produce in their research roles for application in clinical situations. A list of 1,226 concepts was

selected from the literature reporting studies of behavior under stress. An analysis of these research concepts shows that psychiatrists use concepts of personality almost exclusively when studying stressful situations, whereas psychologists are more flexible in combining concepts of personality with those of society and culture. Differences among members of these professions in modes of research conceptualization and in problem selection tend to be more closely related to such factors as the institutional setting in which they work, their religious affiliation, and their self-perception as 'tender' or 'tough' minded, than they are to differences in professional training. (Author)

AD-640 005 **Field 5I, 5A, 12A**
CFSTI Prices: HC$3.00 MF$0.75
Army Personnel Research Office, Washington, D. C.
NOMOGRAMS FOR ARMY MANPOWER POLICY EVALUATION.
Technical research rept.,
by Pauline T. Olson. Jun 66, 92p TRR-1147
Proj. DA-2J023201A711

Descriptors: (*Army personnel, Personnel management), (*Personnel management, Nomographs), Manpower studies, Management control systems, Data processing systems, Statistical analysis, Computers, Equations.

The report presents two sets of nomograms or charts developed on the basis of a series of eight manpower flow models to represent steady-state allocations for various tour lengths and types of assignment in CONUS and overseas. The charts can be used by management personnel to arrive at estimates of effects of a given policy alternative without recourse to a computer or mathematical formulation. Instructions for using the charts, the basic personnel system model, developmental algebraic equations, and an index for locating the appropriate nomogram for a given problem are provided. (Author)

AD-640 067 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Naval Personnel Research Activity, San Diego, Calif.
NAVAL KNOWLEDGE AS A PREDICTOR OF SERVICE TENURE AMONG NROTC OFFICERS.
Research rept.,
by William H. Githens, Idell Neumann, and Norman M. Abrahams. Sep 66, 16p SRR-67-5
Proj. PF016070201

Descriptors: (*Naval personnel, Selection), Officer personnel, Psychometrics, Statistical analysis, Achievement tests.

Identifiers: Personnel screening tests.

The scores on a 30-item Naval Knowledge Test (NKT) administered to NROTC applicants in 1956 were validated in 1966 against the service tenure of 765 officers who had been accepted into the NROTC program and commissioned. In addition to being evaluated as a single predictor, the NKT was examined for useful interrelationships with two other predictors: (1) the Naval College Aptitude Test (NCAT), and, (2) the applicant's response to a question regarding career intention (CQ). The validity of the NKT reached a useful level, but fell short of statistical significance. In view of its lack of statistical significance, and since other significantly valid predictors are now available, use of the NKT in NROTC selection is not recommended. (Author)

AD-640 213 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Data-Design Labs., Ontario, Calif.
DEVELOPMENT OF TEST ITEMS FOR OFFICER SELECTION AND CLASSIFICATION BATTERIES.
Final rept. 15 Dec 64-15 Sep 66,
15 Sep 66, 6p
Contract AF 41 (609)-2743
Proj. AF-7719
Task 771906

Descriptors: (*Officer personnel, Selection), Classification, Test construction (Psychology), Statistical tests, Correlation techniques.

The report is concerned with the production of 100 mechanical-principles test items and 50 background-for-world-events test items. Fourteen 50-item tests were submitted for tryouts to groups of officer candidates who scored above the 65th percentile on the Armed Forces Qualification Test. The average group size was 383. Items were scored on difficulty, phi for each alternative, and phi ratio for the correct alternative. Considerable difficulty was encountered in obtaining the required number of acceptable questions. It is believed that this difficulty stemmed primarily from the lack of an external criteria and, to a lesser extent, from the statistical tests specified.

AD-640 290 **Field 5I, 19G**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
EDUCATION OF A ROCKET STAFF,
by M. Lovkov. 25 Apr 66, 10p FTD-TT-65-1986
TT-66-62432
Unedited rough draft trans. of Krasnaya Zvesda (USSR) 26 Jun p3 1965.

Descriptors: (*Education, Military personnel), Rockets, USSR, Military training.

AD-640 390 **Field 5I**
CFSTI Prices: HC$3.00 MF$0.75
American Institutes for Research, Pittsburgh, Pa.
MOTIVATIONAL FACTORS AFFECTING ARMY RESEARCH AND DEVELOPMENT PERSONNEL.
Technical research rept.,
by Dale W. Dysinger. May 66, 68p
Contract DA-49-092-ARO-32
Proj. DA-2J024701A722
APRO-TRR-1149

Descriptors: (*Army research, Civilian personnel), (*Civilian personnel, Motivation), (*Personnel management, Civilian personnel), Scientific personnel, Scientific research, Attitudes.

Effective personnel management of civilian employees in the Army is hampered by a number of recurring problems. The Military Selection Research Laboratory, U. S. Army Personnel Research Office, has monitored research contracts on three pressing problems concerning (1) determinants of job content for civilian executives, (2) motivation factors for civilian scientists, and (3) local factors affecting selection of first-line supervisors. The present study, conducted by the American Institutes for Research, deals with the second of the three problems and seeks to determine the factors in the individual research scientist and in the work environment in Army R and D laboratories which contribute to positive and to negative motivation on the part of the civilian research staff. The study was begun in the summer of 1964 when approximately 600 R and D scientists and engineers from 12 Army installations were asked to describe specific events and conditions in work experience and environment that had had positive or negative effect on their job attitudes. A checklist, based on the incidents collected, was constructed and administered to a larger sample of the same population (N = 4000) in GS Grade 11 and higher during March and April 1965. In analyses of the checklist data, relationships between job events leading to work satisfaction or dissatisfaction and individual characteristics were examined. (Author)

AD-640 423 **Field 5I**
CFSTI Prices: HC$4.00 MF$1.00
Dunlap and Associates, Inc., Darien, Conn.
TRAINING SYSTEM USE AND EFFECTIVENESS EVALUATION.
Final rept. Mar 65-Jun 66,
by Gabriel G. Jeantheau, and Birger G. Andersen.
Jul 66, 133p
Contract N61339-1743
Proj. 7789-1
NAVTRADEVCEN-1743-1

Descriptors: (*Training devices, Effectiveness), Training, Design, Measurement, Maneuverability, Motor vehicle operators.

Identifiers: Evaluation.

Criteria for evaluation of training device effectiveness were developed. The report examines methods of evaluation with particular emphasis on the problems of objective evaluation in the on-going training situation. Consideration is given to problems of measurement, experimental design, and analysis in the field setting. Further, attention is given to the issues of utilization and design of training devices and their influence on training effectiveness. An evaluation of the Aetna Drivotrainer was made and consequent recommendations are included for the 11H54 Driving Improvement Trainer. A criterion-referenced measurement system was developed for the 1BZ2 Maneuvering Tactics Trainer for possible subsequent use in evaluating that device. (Author)

AD-640 426 **Field 5I, 14D**
CFSTI Prices: HC$11.60 MF$0.75
Human Resources Research Office, George Washington Univ., Alexandria, Va.
MAINTENANCE PERSONNEL AND TRAINING RESEARCH: A BIBLIOGRAPHY.
Staff memo.,
by Helen J. Stiles, and Robert G. Demaree. Mar 58, 120p

Descriptors: (*Maintenance personnel, Bibliographies), (*Training, *Maintenance), Job analysis, Research program administration, Maintenance equipment, Maintainability, Psychometrics.

Identifiers: Troubleshooting.

The report is a 368-item bibliography of maintenance personnel and maintenance training research. Reports are included only if their contents are substantially and specifically applicable to maintenance personnel. Unique contributions in the area of job requirements and maintenance job descriptions are included. Most attention was given to reports appearing in 1951 or later. Reports are arranged in the following sections with references listed alphabetically by senior author: Maintenance research programs and their management, Design of equipment and work situations for maintainability, Job description and forecasting, Selection, Training, Training equipment, Proficiency measurement and criteria of job performance, Job aids and handbooks, Collected works, and Bibliographies and indexes. (Author)

AD-640 427 **Field 5I**
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania State Univ., University Park.
INSTRUCTIONAL FILM PRODUCTION, UTILIZATION AND RESEARCH IN GREAT BRITAIN, CANADA AND AUSTRALIA (RAPID MASS LEARNING).
Technical rept.,
by Leslie P. Greenhill, and John Tyo. 1 May 49, 30p
Contract N6onr-269 (07)
Projs. NR-781-005, SDC-20-E-4
SPECDEVCEN-269-7-1

Descriptors: (*Training films, Scientific research), Education, Military training, Production, Great Britain, Canada, Australia.

Contents: Great Britain: The British tradition in documentary films, Instructional films during the war, Instructional films in education, Use of instructional films in universities, Instructional

film research, Producers of instructional films, Organizations interested in promoting the development of instruction films, The technique of factual film production in Britain. Canada: The National Film Board of Canada, Functions of the National Film Board, Production facilities, Distribution and exhibition of films, The documentary tradition. Australia: Audio-visual aids in military training, Audio-visual aids in education.

AD-640 446 **Field 5I, 5J**
CFSTI Prices: HC$3.00 MF$0.75
Pennsylvania State Univ., University Park.
THE RELATIVE EFFECTIVENESS OF MASSED VERSUS SPACED FILM PRESENTATION (RAPID MASS LEARNING),
by Philip Ash. 30 Jun 49, 84p
Contract N6onr-269 (07)
Proj. NR-781-005
SPECDEVCEN-TR-269-7-3
Rept. on Instructional Film Research Program.

Descriptors: (*Teaching methods, Effectiveness), (*Training films, Teaching methods), Learning, Time, Retention.

Conclusions: When a typical hour-long series of instructional motion pictures is used as the sole teaching tool, students learn about the same amount from the series whether they are shown all the reels comprising the series in one long training session, or one reel at a time in several short training sessions. Increasing the length of the training session to one hour does not seem to result in a diminution of interest on the part of the learners. Furthermore, a learner's test performance is practically independent of his rated interest in the films. Long massed film sessions are about as effective in ensuring long-term (two-week) retention of the film content as short spaced sessions are. While previous knowledge of some parts of the film content results in higher test scores, the effects of previous knowledge or its lack are about the same whether the reels in a training films series are presented in one long, or in several short spaced, sessions. The general conclusion may be stated as follows: that a few hour-long film training sessions, like hour-long classes, result in learning about as efficient as that achieved by many short training sessions. (Author)

AD-640 450 **Field 5I, 5J**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park.
LEARNING THEORIES AND INSTRUCTIONAL FILM RESEARCH (RAPID MASS LEARNING).
Technical rept.,
by Kinsley R. Smith, and E. B. vanOrmer. Jun 49, 14p
Contract N6onr-269 (07)
Projs. NR-781-005, SDC-20-E-4
SPECDEVCEN-269-7-6

Descriptors: (*Learning, *Training films), Research program administration, Theory.

In the early planning and development stages of the Instructional Film Research Program, it was realized that a systematic approach to the field of research problems relating to instructional sound motion pictures was a necessity. The need was also seen for a classification of the various specific research problems which came to the foreground in staff conferences. Accordingly a conceptual framework was evolved which would serve to indicate areas in which research on instructional sound motion pictures might be profitably conducted. The primary purpose of the report is to provide an outline of this frame of reference. The framework has proved to be a useful working guide for the Instructional Film Research Program. Perhaps it may be of assistance to other research workers, not only in the field of instructional films but also in the closely related fields of 'mass instruction' by radio and television. (Author)

AD-640 503 **Field 5I**
CFSTI Prices: HC$2.00 MF$0.50
Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
A COMPARISON OF RESPONSE CONFIRMATION TECHNIQUES FOR AN ADJUNCTIVE SELF-STUDY PROGRAM.
Final rept., Mar-Oct 65,
by Donald E. Meyer. Jun 66, 32p AMRL-TR-66-98
Proj. AF-1710
Task 171003

Descriptors: (*Programmed instruction, *Military training), Fighters, Aviation personnel, Feedback, Display systems.

An experimental evaluation was made of various methods to confirm responses to an adjunctive self-study program. The adjunctive program was designed to teach aircraft engineering features of the F-101B as part of a continuing program of refresher training for operational fighter interceptor aircrews. The adjunctive program consisted of a comprehensive series of carefully sequenced multiple choice questions. Each question referred to the page and paragraph number of a publication containing detailed information on which the question was based. Responses to the questions were confirmed as being either correct or incorrect by one of the experimental treatments. When a student responded correctly he continued on to the next question, when he responded incorrectly he studied the appropriate information in the manual before continuing on with the program. The response confirmation treatments were (1) chemically impregnated inks which change color when moistened with a wetting agent, (2) punchboards, (3) opaque erasable overlays, and (4) machine presentation and response confirmation. The response confirmation treatments varied widely in cost and difficulties in preparation. No significant differences in learning were found as a result of the experimental treatments, nor were there any notable differences between group opinions concerning the efficacy of the particular response confirmation method used. Upon this basis, the selection of a response confirmation mode for an adjunct program may be based upon cost and availability of equipment and materials. (Author)

PB-173 130 **Field 5I**
CFSTI Prices: HC$1.10 MF$0.50
Wales Univ., Cardiff.
HOW SIXTH FORM ENGLISH IS SLIPPING,
by A. J. Kirkman. 1964, 1p
Reprinted from Engineering v197 n5108 p371 Mar 13 1964. Rept. on NSF Scientific Documentation Project.

Descriptors: (*Students, English language), (*Education, English language), Great Britain, Universities.

PB-173 177 **Field 5I**
CFSTI Prices: HC$15.60 MF$1.25
Human Sciences Research, Inc., McLean, Va.
THE NATURE OF AUTOMATED JOBS AND THEIR EDUCATIONAL AND TRAINING REQUIREMENTS,
by S. A. Fine. Jun 64, 260p HSR-RR-64/6-Ae
Contract OAM-3-63

Descriptors: (*Job analysis, *Automation), (*Education, Automation), (*Training, Automation), Labor, Personnel management, Manpower studies.

Automation tends to be engineered to eliminate low functional level jobs occurring in mass production and assembly situations. The ratio of low functional level jobs to high functional level jobs in production is probably approaching equality. There is an increasing orientation to Data in the high functional level jobs and also less direct contact (manipulative skill) with Things. This is also related to greater flexibility and adaptability to continuous technological change. These requirements are the basis for higher educational requirements. There is a tendency in light industry to employ women in low functional level jobs that are vulnerable to elimination by further developments in automation. Where low functional level jobs are entry to higher functional level jobs, the need for more education is manifest since the likelihood of moving up is much greater. Jobs in automated situations, other than the feeding and tending jobs, are considered more interesting and challenging, but also more tension producing, possibly due to the higher responsibility associated with them.

AD-639 625 **See Field 6S**

AD-639 630 **See Field 6N**

AD-639 674 **See Field 14A**

AD-639 779 **See Field 1B**

AD-640 071 **See Field 17I**

AD-640 072 **See Field 17I**

AD-640 073 **See Field 14B**

AD-640 127 **See Field 5B**

AD-640 129 **See Field 5B**

AD-640 146 **See Field 5K**

PB-173 207 **See Field 5A**

PB-173 208 **See Field 5A**

5J. PSYCHOLOGY (INDIVIDUAL AND GROUP BEHAVIOR)

AD-639 627 **Field 5J, 17I**
CFSTI Prices: HC$4.60 MF$0.50
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
SPEED AND ACCURACY OF OPERATING THE TARGET DESIGNATION TRANSMITTER MARK 11 MOD 1 AND THE BEARING AND RANGE INDICATOR MARK 3 MOD 2.
by J. W. Gebhard. 15 Nov 48, 43p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-66

Descriptors: (*Radar operators, Performance (Human)), Radar equipment, Operation, Radar targets, Errors, Direction finding.

Two experiments were performed to measure the speed and accuracy of operating the TDT-11 and BRI-3 equipments. The first experiment measured the speed and accuracy with which radarmen can designate randomly assigned targets with the TDT-11 equipment. Six operators and one TDT unit were tested. The VF indicator provided the accuracy criterion. The second experiment measured the speed and accuracy with which radarmen can receive randomly assigned targets with the BRI equipment. Six operators and two BRI units were tested. The VF indicator provided the accuracy criterion. (Author)

AD-639 628 **Field 5J, 20A**
CFSTI Prices: HC$2.00 MF$0.50
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
AUDITORY SIGNALS,
by W. R. Garner. 15 Jan 49, 34p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-71

Descriptors: (*Auditory signals, Psychoacoustics), Hearing, Intensity, Radio ranges, Frequency, Psychophysiology.

Auditory signals are a form of display, but are usually characterized by being discrete in time, and some action is assumed on receipt of the information. Whenever a communications situation is concerned with a limited kind of information, an auditory signal can be used to provide a fast indicator

of what to do. They are likewise useful as a substitute for visual displays when the visual load on an operator becomes too great. One of the chief advantages of the auditory signal is that the transmission of information can be completely automatic. The radio range is a relatively simple form of auditory signal, and research on the use of the radio range involves simple intensity discrimination of tones. Flybar, on the other hand, is a complex form of auditory signal which provides three simultaneous signals for use by aircraft pilots in flight. These two systems of auditory signals have been used to illustrate the type of research which is done on these problems. The major research requirement for auditory signals is basic research in the psychology of hearing. Of the many topics which are covered in that area, however, research on simple and complex discrimination, stimulus interactions, auditory localization, psychological scaling, and auditory illusions appears to be the most profitable from the point of view of possible application to the problems of auditory signalling. (Author)

AD-639 647 **Field 5J, 12A**
CFSTI Prices: HC$1.00 MF$0.50
Arizona State Univ., Tempe.
COALITION FORMATION AMONG MALES IN A THREE-PERSON GAME AS A FUNCTION OF VARYING PAY-OFF MATRICES,
by Donald R. Witters, and Arthur J. Bachrach.
Oct 65, 13p
Contract Nonr-2794 (03)

Descriptors: (*Group dynamics, *Game theory), Matrix algebra, Students, Males.

Identifiers: Reinforcement (Psychology).

Three male university students were placed in a group situation in which the subjects (Ss) earned points by responding on a switch in alliance with another member of the group. The matrix value of each player was changed from a matrix of equality (A = B = C) to several pay-off matrices of inequality (A < (B+C)), (A > B > C), (A > (B+C)). It was found that the Ss pursued a strategy in which the group earning was kept maximal and, at the same time, individual work was kept minimal. At the end of each session the day's earnings were split equally among the three players. (Author)

AD-639 648 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Arizona State Univ., Tempe.
REWARD MAGNITUDE EFFECT ON A TWO KEY CHOICE SITUATION INVOLVING AN ADJUSTING SCHEDULE,
by Donald R. Witters. Jun 66, 14p
Contract Nonr-2794 (03)

Descriptors: (*Decision making, Psychometrics), Behavior, Performance tests, Humans, Pigeons.

Identifiers: Reinforcement (Psychology).

The effects of reward magnitude on choice point behavior were studied using human and pigeon subjects. The subject had to respond on one of two keys each of which had programmed on it a ratio schedule. By means of an adjusting schedule the subject was able to equate preference for the two schedules even though reward magnitude was not equal on these schedules. It was observed that choice behavior varied systematically as a function of the difference between the amounts of reward offered on the keys. (Author)

AD-639 649 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Arizona State Univ., Tempe.
SCHEDULE CONTROL OF SOCIAL BEHAVIOR,
by H. A. Rogers, and D. A. Witters. Jun 66, 17p
Contract Nonr-2794 (03)

Descriptors: (*Group dynamics, *Behavior), Psychometrics, Social psychology.

Identifiers: Reinforcement (Psychology).

In two different experimental situations the effects of cooperative responding by two subjects (Ss) were studied on a fixed ratio schedule of reinforcement. Similar results were seen in both experiments. It was observed that the rate of responding of one S is a function of the rate of the other S. As the rate of the first S increases the rate of the second S decreases. This relation is seen most clearly in the second experiment in which the rate of the second S (a clock) was a known constant value. (Author)

AD-639 656 **Field 5J, 12A**
CFSTI Prices: HC$1.00 MF$0.50
Florida State Univ., Tallahassee. Dept. of Statistics.
THE USE OF LIMIT THEOREMS IN PAIRED COMPARISON MODEL BUILDING.
Technical rept.,
by W. A. Thompson Jr, and Jagbir Singh. Jun 66, 21p FSU-Statistics-M111
Contract Nonr-988 (08), Grant NSF-GP-3807
Proj. NR-042-004
ONR-TR-20

Descriptors: (*Theorems, Mathematical models), (*Mathematical models, *Psychometrics), Conditioned reflex, Reaction (Psychology).

Identifiers: Psychophysics, Paired comparison, Limit theorem.

The Thurstone and the Bradley-Terry models, both initially advanced on intuitive grounds, have proved useful in the analysis of paired comparisons. The psychological meaning of these models and their relation to one another is unclear, but they fit data. Stevens has observed that there may be two basic mechanisms of discrimination (1) additive and (2) substitutive. We advance two corresponding mathematical models: that experienced sensation is (1) the sum of a large number of independent signals and (2) the maximum of a large number of independent signals. These assumptions yield (1) Thurstone's model and (2) the model of Bradley-Terry. Psychological interpretations of the various parameters, in terms of sensation, present themselves in a natural manner. Thus this paper presents a theory which unifies and interprets two paired comparison models that have proved useful in fitting experimental data. (Author)

AD-639 657 **Field 5J, 12A**
CFSTI Prices: HC$1.00 MF$0.50
Florida State Univ., Tallahassee. Dept. of Statistics.
MODELS FOR PAIRED COMPARISONS.
Technical rept.,
by W. A. Thompson Jr, and Jagbir Singh. Jul 66, 16p FSU-Statistics-M115
Contract Nonr-988 (08), Grant NSF-GP-3807
Proj. NR-042-004
ONR-TR-21

Descriptors: (*Mathematical models, *Psychometrics), Conditioned reflex, Reaction (Psychology), Sensation (Physiology), Probability.

Identifiers: Psychophysics, Paired comparison.

A central concept in this paper is that of linear model. A model is called linear if the frequency probability with which a subject reports the stimulus X sub 1 as greater than X sub 2 has the form H (t (X sub 1)-t (X sub 2)). Interrelations among various models for paired comparisons are studied. The Thurstone, Bradley-Terry, and Scheffe models are treated as special cases of the general linear model. It is shown that all of these special cases introduce a concept of 'psychological distance between stimuli.' The increase or decrease of the probability of detecting the larger stimulus for linear-models is shown to depend primarily on t rather than H. The uniqueness of the linear representation of a Bradley-Terry model is discussed. A final section proposes a general model allowing for the response of no apparent difference. (Author)

AD-639 681 **Field 5J**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md.
PITCH CHARACTERISTICS OF SHORT TONES. I. TWO KINDS OF PITCH THRESHOLD,
by J. J. Doughty, and W. R. Garner. 13 Jun 47, 15p
Contract N5ori-166 (01)
SPECDEVCEN-166-I-14
Availability: Published in The Journal of Experimental Psychology v37 n4 p351-65 Aug 1947.

Descriptors: (*Pitch discrimination, *Thresholds (Physiology)), Psychoacoustics, Hearing.

As the duration of a tone is increased from something on the order of two msec. to approximately one-half sec., the pitch of the tone goes through three stages. In the first stage, only a click is heard. In the second stage, the sensation is still that of a click, although the click has some pitch character to it. In the third stage, the tone definitely has a pitch character, and that character will change little, if at all, with further increase in the duration of the tone. In the experiment reported here, duration-thresholds have been obtained for these latter two stages, called click-pitch and tone-pitch, respectively. It was found that these thresholds vary to some extent with both frequency and intensity, and that the difference in duration between the two thresholds is relatively constant for all conditions. It is concluded that the thresholds for tone-pitch probably define the lower limits of duration which may be used if the pitch character of the tone is to remain relatively stable, and if reasonably accurate pitch discrimination is required. With shorter durations, pitch discrimination breaks down rapidly. (Author)

AD-639 687 **Field 5J, 6F**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
THE STABILITY OF 'IMPROVEMENT' IN COLOR VISION DUE TO TRAINING, A REPORT OF THREE CASES,
by Alphonse Chapanis. 18 Apr 49, 9p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-I-89
Availability: Published in American Journal of Optometry and Archives of American Academy of Optometry v26 n6 p251-9 Jun 1949.

Descriptors: (*Color vision, Tests), Training, Performance (Human), Military personnel.

The author examined three men who, during the war years, were rejected for military service because of color deficiency. Two of these men received training on color vision tests from optometrists; the third obtained a copy of the test and trained himself with the help of a friend. All three were also eventually able to pass the color vision tests given at recruiting centers. The author's examination included two tests which these men had never seen before. All three men failed these tests without any question. When examined with tests which had been used in their training, the three men failed when they took the tests honestly. Two of the men, however, could have achieved considerably better scores if they had relied on their memories for specific cues and had given correct answers, even though they did not honestly see the correct numbers as clearly as the incorrect ones. There is, in short, no evidence here that training had any genuine effect on their color discrimination. The training was useful, however, in enabling these men to pass the tests on which they were trained by making use of cues which the color normal person never needs to use. (Author)

AD-639 688 **Field 5J, 6P**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
SIMULTANEOUS CHROMATIC CONTRAST IN NORMAL AND ABNORMAL COLOR VISION,
by Alphonse Chapanis. 11 Apr 49, 15p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-I-90
Availability: Published in American Journal of Psychology v62 n4 p526-39 Oct 1949.

Descriptors: (*Color vision, Tests), Performance (Human).

The Royal Canadian Navy Colour-Vision Test-Lantern was administered to 86 color-normal and 34 color-deficient Os. This lantern presents red, green, and white lights in pairs and in all possible permutations. An analysis of the data shows that the color names applied to the green and white lights by color deficient Os are partly determined by the color of the other light in the pair. This is the phenomenon of 'heightened color contrast' which earlier investigators had described as being characteristic of anomalous vision. The chief value of this paper is that it presents a large number of systematic observations on this effect. Color naming, both by color normal and color deficient individuals, forms a consistent pattern when examined in the light of more careful laboratory studies of differential chromatic sensitivity. The data on 'heightened color contrast' can be fitted into the same schema if it is assumed that contrast is some function of an individual's differential sensitivity. In color defective vision, differential sensitivity is greatly decreased so that the defective individual, even though he may experience no more contrast than a normal individual, has an effectively greater range of colors from which to select what to him are appropriate color names or matches. (Author)

AD-639 806 **Field 5J**
Not available from CFSTI.
Defence Research Medical Labs., Toronto (Ontario).
COMPARISON OF THE DRAWING AND MATCHING METHODS FOR JUDGING SHAPE.
Research paper,
by A. H. Smith. 19 Apr 66, 13p DRML-RP-623
Availability: Published in Perceptual and Motor Skills v23 p3-15 1966.

Descriptors: (*Geometric forms, *Visual perception), Canada.

Observers judged the slant and shape of a circle, a rectangle and a triangle binocularly under reduced viewing at 0, 15, 30, 45, and 60 degrees geometric slant. In Exp. I they drew shape with drawing size unrestricted (Draw I) and matched shape with the horizontal axes of 14 comparison shapes constant (Match I). In Exp. II, a different group drew shape by the method of Draw I and with the horizontal axis of the drawing constant (Draw II) and matched shape with the areas of 14 comparison shapes variable (Match II). Slant was underestimated. Draw I and Match I produced about the same overall constancy in Exp. I, Draw I and Match II about the same in Exp. II. Draw II produced more constancy than Draw I and Match II in Exp. II. There was more constancy for the rectangle than for the circle and triangle. The results were contrary to the view that drawn shape is confounded with implicitly registered slant and were inconclusive for the invariance hypothesis. (Author)

AD-639 807 **Field 5J**
Not available from CFSTI.
Defence Research Medical Labs., Toronto (Ontario).
PERCEPTION OF SHAPE AS A FUNCTION OF ORDER OF ANGLES OF SLANT.
Research paper,
by A. H. Smith. 17 Apr 66, 8p DRML-RP-627
Availability: Published in Perceptual and Motor Skills v22 p971-8 1966.

Descriptors: (*Geometric forms, *Visual perception), Canada.

24 Os viewed a rectangle and a triangle binocularly under reduced viewing conditions. The forms were shown in the frontal-parallel plane and at slants of 15, 30, 45, and 60 degrees in random, increasing and decreasing order of angles. Os judged shape by matching and by drawing. There was more constancy for decreasing order than for increasing order. The results for random order were inconclusive. The differences between the indices for drawing and matching were, in general, not significant. The rectangle produced more constancy than the triangle, especially at large slants. The series effect was contrary to prediction based on Helmholtzian and Gestaltist interpretations of the relation between phenomenal slant and phenomenal shape and was interpreted as consistent with adaptation-level theory on the assumption that the focal stimuli affected responses more than the residual stimuli. (Author)

AD-639 808 **Field 5J**
Not available from CFSTI.
Defence Research Medical Labs., Toronto (Ontario).
A TEST OF THE EXISTENCE OF MONOCULAR STEREOSCOPIC DEPTH PERCEPTION.
Research paper,
by G. R. Engel. 11 Jun 66, 4p DRML-RP-634
Availability: Published in Perceptual and Motor Skills v23 p235-8 1966.

Descriptors: (*Space perception, Performance tests), Canada.

Three Os, highly trained in observing visual phenomena, viewed a pair of Julesz Stereo Random Brightness Fields presented alternately to the same eye. Under no circumstances was there any report of stereoscopic depth arising from this mode of presentation. This finding contradicts recent reports of monocular stereoscopy obtained by alternately presenting both halves of a stereo pair to the same eye. It is concluded that impressions of depth gained in this way are not due to stereopsis but to the presence of monocular depth cues in the stimuli. Stereoscopic stimuli, such as Random Brightness Fields, which contain no monocular depth cues, do not give rise to the perception of depth. (Author)

AD-639 855 **Field 5J, 17I, 5E**
CFSTI Prices: HC$3.60 MF$0.50
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
SOME ASPECTS OF OPERATOR PERFORMANCE ON THE VJ REMOTE RADAR INDICATOR.
Technical rept.,
by A. Chapanis. 20 Jun 49, 52p
Contract N5ori-166 (01)
Projs. NR-784-001, 20-F-1
SPECDEVCEN-166-1-91

Descriptors: (*Radar operators, Performance (Human)), Radar equipment, Direction finding, Range finding.

These experiments had two purposes: (a) to find out how fast and how accurately operators could extract bearing and range information from the VJ remote radar indicator when they used it in different ways, and (b) to provide information about ways of performing equipment appraisals. Two experiments were performed, each involving many thousands of separate data obtained under a variety of operating conditions. Throughout most of these experiments, the VF was used as the criterion of accuracy because it is inherently much more accurate than the VJ. In some of the analyses, comparisons were made of range (or bearing) differences between the reports turned in from two VJs on identical targets. The latter is a measure of how much two VJs will disagree when they report on identical targets. (Author)

AD-639 864 **Field 5J**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Dept. of Psychology.
STUDIES OF MANUAL ROTARY POSITIONING MOVEMENTS: I. THE PRECISION OF SETTING AN INDICATOR KNOB TO VARIOUS ANGULAR POSITIONS,
by Alphonse Chapanis. 11 Oct 50, 14p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-I-59
Availability: Published in Journal of Psychology v31 p51-64 1951.

Descriptors: (*Proprioception, Performance (Human)), Visual signals, Hands, Sensory deprivation, Errors, Performance tests.

The experiment was designed to collect information necessary to answer a purely practical question: 'In the absence of visual cues how accurately can a person rotate a selector switch knob to any angular position.' Eight subjects each made 800 settings to each of 20 different angular positions. One-half of the settings were made without any visual guide before the subject, the other half were made with a visual guide (a protractor drawn on a cardboard) directly in front of the subject's eyes. At no time, however, could the subject see either his hands or the knobs. The results show that subjects can set an indicator knob to the horizontal and vertical with considerable precision. Settings made to angular positions between these are considerably worse. Settings between 0 and 90 degrees show small negative constant errors, those between 90 and 180 degrees show small positive constant errors. This seems to show that subjects judge the setting of the knob as being somewhat more vertical than it really is. There is some evidence that the use of the visual guide increased the precision of the settings. There was some practice effect evident in the data. Among the trials made without the visual guide, the second 200 settings had smaller variable errors than the first 200 settings. Constant errors for the second 200 settings, however, were greater than those for the first 200. Settings between 0 and 90 degrees can be made with greater precision by the right hand than by the left hand. Settings between 90 and 180 degrees can be made with greater precision by the left hand than by the right hand. (Author)

AD-639 867 **Field 5J, 6P**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Dept. of Psychology.
RELATIONSHIPS BETWEEN AGE, VISUAL ACUITY AND COLOR VISION,
by Alphonse Chapanis. 1950, 33p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-I-103
Availability: Published in Human Biology v22 n1 p1-33 Feb 1950.

Descriptors: (*Aging (Physiology), Vision), (*Visual acuity, Aging (Physiology)), (*Color vision, Aging (Physiology)), Tests, Correlation techniques.

Five hundred and seventy-four visitors to the Baltimore Sesquicentennial Exhibition were tested with a near visual acuity test chart and with five pseudo-isochromatic tests of color vision. The visitors ranged from 7 to 77 years of age. The results of this investigation show that: (1) There is a marked curvilinear relationship between age and visual acuity. Very young and very old examinees do not attain as good visual acuity ratings as do those individuals in the age range of 15 to 50. (2) There is a slightly positive relationship between age and color vision test score. This relationship appears to be due entirely to the fact that very

young examinees do not earn as high scores as adults do. When recomputed for individuals 15 years and older, the correlations are all zero. There is no evidence that very old examinees are handicapped on these color vision tests. (3) There is some slight evidence of a positive relationship between visual acuity and color vision test scores. Although several statistically significant correlations were found, the correlations are all so small as to be practically insignificant. It is concluded that errors on present pseudo-isochromatic tests of color vision are largely independent of minor defects in form vision. (Author)

AD-640 018 **Field 5J**
CFSTI Prices: HC$2.00 MF$0.50
Delaware Univ., Newark. Center for Research on Social Behavior.
COMPONENTS OF GROUP RISK TAKING.
Technical rept.,
by Allan I. Teger, and Dean G. Pruitt. 26 Aug 66, 38p TR-18
Contract Nonr-2285 (02)

Descriptors: (*Group dynamics, *Decision making), Social psychology, Behavior, Social communication.

In a partial replication of an earlier study by Wallach and Kogan, group risk taking was examined under conditions of discussion and information exchange. Group size was also manipulated. Unlike the earlier findings, a risky shift occurred in the information exchange condition, where the subjects only revealed to one another the contents of their prior decisions. A stronger risky shift was found when discussion was permitted. Risky shift was more pronounced the larger the size of the group. The extent of risky shift on a decision problem was found to be positively related to the initial level of risk on that problem. The results appear to support Brown's 'value of risk' theory of group risk taking more closely than any other theory. (Author)

AD-640 040 **Field 5J, 5E**
CFSTI Prices: HC$1.00 MF$0.50
Rochester Univ., N. Y. Dept. of Psychology.
STUDIES IN THE ACCURACY OF MOVEMENT. I. THE BISECTION AND DUPLICATION OF LINEAR EXTENTS IN THE HORIZONTAL SAGITTAL PLANE.
Technical rept.,
by S. D. S. Spragg, D. B. Devoe, and A. L. Davidson. Oct 49, 23p
Contract N6onr-241 (06)
Projs. NR-783-006, SDC-20-M-1-d
SPECDEVCEN-241-6-1

Descriptors: (*Performance (Human), Errors), Motion, Hands, Performance tests, Control panels, Motor reactions.

An attempt was made to determine the accuracy of simple linear movements in a horizontal plane parallel to the sagittal section. Subjects (10 in Experiment 1, 11 in Experiment 2) sampled a given extent of linear movement by moving a rider back and forth on a track, and then attempted to bisect that extent (Experiment 1) or to duplicate it (Experiment 2). Distances ranged from 6 to 24 cm. in the first experiment, 4 to 18 cm. in the second. The results, expressed both as Mean Average Error (absolute deviations from the external standard), and as Mean Constant Error, indicate that: (1) proportional accuracy is greater for the duplication tasks than for bisection; (2) the proportional accuracy of duplicating sampled extents is considerably greater for the longer distances studied (8, 12, and 18 cm.) than for the shortest distance (4 cm.), the Mean Constant Error indicating a zero-order bias for the two longest distances and a rather large positive bias (approximately 11%) for the 4 cm. extent; (3) accuracy of bisecting sampled distances does not improve with increase in distance for the values studied (Mean AE remains at approximately 18%, Mean CE at about 15%), most of the error being due to a large and persistent positive bias (over-setting); (4) in this study no general superiority was found for settings made toward the subject or away from him. (Author)

AD-640 041 **Field 5J, 5E**
CFSTI Prices: HC$2.00 MF$0.50
Rochester Univ., N. Y. Dept. of Psychology.
STUDIES IN THE ACCURACY OF MOVEMENT. III. THE BISECTION AND DUPLICATION OF ANGULAR EXTENTS AS A FUNCTION OF SIZE OF ANGLE AND OF TYPE OF END POINT CUE.
Technical rept.,
by S. D. S. Spragg, and D. B. Devoe. Oct 50, 28p
Contract N6onr-241 (06)
Projs. NR-783-006, SDC-20-M-1d
SPECDEVCEN-241-6-4
See also AD-640 040.

Descriptors: (*Performance (Human), Errors), Motor reactions, Motion, Control panels, Hands.

This report is the third in a series of studies on the accuracy of movement. Experiments are reported in which subjects (N=12) turned a 2.5 inch diameter knob through an angular extent and then attempted either to bisect that extent or to duplicate it. The study is concerned with the accuracy and precision of such responses as a function of the angular extent to be bisected or duplicated (ranging from 20 to 160 degrees) and of the type of endpoint cue provided (tactual-kinesthetic, visual, or auditory). The results presented as mean average error (AE) and mean constant error (CE) showed no significant differences related to type of endpoint cue. Size of angle was found to be a highly significant variable. Accuracy and precision increased significantly with increase in angle size, both for duplication and for bisection, with most of the improvement being achieved from 20 to 80 degrees and relatively little from 80 to 160 degrees. For bisection a rather large positive CE (over-setting) of 25 per cent was found at 20 deg. which remained positive throughout but was reduced to 11 per cent at 160 deg. For duplication a positive CE of 14 per cent was found at 20 deg. but was reduced rapidly and was of zero order for 80 and 160 deg. (Author)

AD-640 042 **Field 5J, 5E**
CFSTI Prices: HC$1.60 MF$0.50
Rochester Univ., N. Y. Dept. of Psychology.
STUDIES IN COMPLEX COORDINATION. II. PERFORMANCE OF THE TWO-HAND COORDINATOR AS A FUNCTION OF THE RELATIONS BETWEEN DIRECTION OF ROTATION OF CONTROLS AND DIRECTION OF MOVEMENT OF DISPLAY.
Technical rept.,
by E. B. Norris, and S. D. S. Spragg. Nov 50, 19p
Contract N6onr-241 (06)
Projs. NR-783-006, 20-M-1d
SPECDEVCEN-241-6-5

Descriptors: (*Hand cranks, Performance tests), (*Control panels, Human engineering), Display systems, Performance (Human), Rotation.

The study was designed to investigate performance of a two-hand coordination task as a function of the direction of rotation of the controls in relation to the direction of movement of the display. The SAM Two-Hand Coordinator was modified so that (a) the effect of the direction of rotation of the crank on the movement of the display could be reversed and (b) the cranks could be placed in either the vertical or horizontal plane. These results indicate that in the design of equipment controls where control cranks must be turned simultaneously by the two hands, superior performance will result if there is continuity between the plane and direction of movement of the controls, and the plane and direction of movement of the display. (Author)

AD-640 060 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
TARGET CODING BY MEANS OF VISUAL FLICKER.
25 Oct 4 , 6p
SPECDEVCEN-166-1-68

Descriptors: (*Visual signals, Coding), (*Targets, Coding), Light, Frequency, Visual perception.

Identifiers: Flicker.

Conclusions: Flicker used for coding must be coarse flicker, not fine flicker. Therefore, it will be necessary to stay well below the fusion frequency at all times. The range of frequencies available for scaling into a usable code system is from about one-half to not more than 45 flashes per second. The upper value is probably too high and it may well be that 30 fps is a better figure. To obtain 45 fps without fusion, retinal intensities of about 1000 millilamberts are required. For 30 fps, this value is about 10 millilamberts. It seems likely that little discriminable difference will be found between frequencies from 20 to 40 fps; i.e., flicker at 20 fps will look much like flicker at 30 or 40 fps. The more readily distinguishable steps will be found under 20 fps. The number of discriminable steps between one-half fps and 30 fps is unknown. This is also true of the reliability of such discriminations which may be a matter of practice. Crude observations suggest that about 15 steps are what can be expected. Factors such as the area and position of the retine affected by flicker are of undetermined importance in the practical application. However, it appears that the size of the retinal image should not be appreciably under two degrees and that the targets should always be viewed along the line of sight. It seems likely that using flashes of light in certain special patterns of intermittence would be a profitable area to explore. (Author)

AD-640 077 **Field 5J, 5H, 5E**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Baltimore, Md.
PSYCHOLOGICAL PROBLEMS IN CODING INFORMATION FOR VISUAL DISPLAYS,
by J. W. Gebhard. 10 May 49, 8p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-93
Prepared for presentation at Undersea Symposium (4th), May 16-17, Washington, D. C.

Descriptors: (*Display systems, Coding), (*Coding, Visual signals), Combat information centers, Human engineering.

The conventional two-dimensional display is only satisfactory for presenting two-variable information. It is desirable to get more variables into a two-dimensional display. Coding the target spots provides a way of doing this. Coding may be done by varying the target spots in color, brightness, size, intermittence, and shape. These may be used in combination. To assess the utility of these codes will require much fundamental research on discriminability, scaling and learning. A display of many targets, each complexly coded, may make a single display completely incomprehensible. Therefore, the problem of interpretability must be studied in the final phase of the work on coding. (Author)

AD-640 081 **Field 5J, 6P**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md.
A SCALE OF SUBJECTIVE BRIGHTNESS,
by R. M. Hanes. 17 Sep 48, 15p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-51
Availability: Published in Journal of Experimental Psychology v39 n4 p438-52 Aug 1949.

Descriptors: (*Visual perception, *Brightness), Colors, Psychophysiology, Color vision, Psychometrics.

The fractionation technique has been used to obtain estimates of brightness for various time patterns and for various hues. Because of equipment limitations only the range from about 0.0001 to 100 millilamberts has been investigated thus far. It has been shown that such estimates can be made consistently with only a reasonable degree of error. The duration of the stimulus has been found to have no appreciable effect on these judgments so long as the stimulus duration is long enough to allow the sensation to reach a steady state. Hue, likewise, has been shown to cause little change except, perhaps, at very low levels. A subjective brightness or brilliance scale has been constructed and has been found to agree closely with the curve obtained by integrating DL's. (Author)

AD-640 086 **Field 5J, 20A**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
THE LOUDNESS AND LOUDNESS MATCHING OF SHORT TONES,
by W. R. Garner. 20 Mar 49, 6p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-88
Availability: Published in The Journal of the Acoustical Society of America v21 n4 p398-403 Jul 1949.

Descriptors: (*Auditory acuity, Thresholds (Physiology)), Psychoacoustics, Sound, Measurement, Intensity, Acoustics.

A monaural loudness matching technique was used to study differential sensitivity to intensity as a function of tonal duration. The probable error (p.e.) of the loudness matches was used as the measure of differential sensitivity. With one technique, a standard tone of 500 milliseconds duration was followed by a tone of variable duration (10-500 milliseconds) after a silent interval of 50, 100, or 500 milliseconds. In another technique, both standard and comparison tones were of the same duration (10-500 milliseconds) with the same silent intervals between tones as before. (1) When the standard tone was always 500 milliseconds, the p.e. of the loudness matches increased with a decrease in the duration of the comparison tone from approximately 0.60 to 2.30 db, and the length of the silent interval had no effect on the function. (2) When both the standard and comparison tones had the same duration, the p.e. again increased with a decrease in duration; in this case, however, a silent interval of 500 milliseconds caused an increase from approximately 0.60 to 2.50 db while a silent interval of 50 milliseconds caused an increase to only 1.00 db. These differences are explained in terms of two different processes: a dissimilarity effect, and an interference effect. (3) When a standard tone of constant duration is used to obtain loudness matches, the mean of the matches becomes a measure of the loudness of tones as a function of duration. (Author)

AD-640 088 **Field 5J**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md.
THE CONSTRUCTION OF SUBJECTIVE BRIGHTNESS SCALES FROM FRACTIONATION DATA: A VALIDATION,
by R. M. Hanes. 11 Jul 49, 10p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-97
Availability: Published in Journal of Experimental Psychology v39 n5 Oct 1949.

Descriptors: (*Brightness, Test construction (Psychology)), Scale, Psychophysiology, Visual perception.

It was concluded that: (1) The estimation of fractional and multiple brightness is feasible and leads to consistent results for group means. (2) The estimates are, nevertheless, very easily influenced by a large number of factors. (3) Individual differences are significant and in some cases may be quite large. (4) Even with this great variability, group estimates of 1/2 are significantly different from estimates of 1/3, and double estimates are significantly different from triple estimates. (5) The various fractional and multiple estimates used in the present experiment lead to subjective scales which are not significantly different. Therefore, the results are considered as a validation of the fractionation procedure for the construction of scales to represent sensory experience. (6) The subjective scale obtained from the present results is in essential agreement with the previous scale (8) and extends the range of physical brightness covered to an upper limit of about 500 millilamberts. (Author)

AD-640 089 **Field 5J**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md.
THE EFFECT OF PSYCHOPHYSICAL METHOD AND CONTEXT ON PITCH AND LOUDNESS FUNCTIONS,
Doctoral thesis,
by J. M. Doughty. 25 Jul 49, 17p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-100
Prepared in cooperation with Franklin and Marshal Coll., Lancaster, Pa.
Availability: Published in Journal of Experimental Psychology v39 n5 p729-45 Oct 1949.

Descriptors: (*Psychoacoustics, Errors), Intensity, Sound, Sound pitch, Functional analysis, Time.

The experiment was designed to test the prediction that the E (experimentor) can predetermine the CE's (constant errors) for pitch and loudness by the selection of the comparison stimuli in the Method of Constant Stimuli. Toward this end CE's were determined under varying conditions of asymmetry in the comparison stimulus series. The CE's for both pitch and loudness were found to vary in a regular manner with these asymmetries in the context. The degree to which the size of the CE could be influenced was found to be quite large. Similar effects were seen to occur in the Method of Average Error. These results are discussed and lead to the following conclusions: (1) Because of the arbitrary selection of the context by the E in the ordinary use of the Method of Constant Stimuli, this method should not be used in the determination of CE's. (2) Because it is the O who determines the context within which his judgments are made in the ordinary use of the Method of Average Error, this method is more likely to give true CE's than is the Method of Constant Stimuli. (3) These two methods give essentially the same results insofar as DL's (difference limens) are concerned and, therefore, either would be suitable for the determination of DL's. (Author)

AD-640 094 **Field 5J, 12A**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Dept. of Psychology.
ACCURACY OF VISUAL INTERPOLATION BETWEEN SCALE MARKERS AS A FUNCTION OF THE NUMBER ASSIGNED TO THE SCALE INTERVAL,
by A. Chapanis, and M. Leyzorek. 10 Jul 50, 13p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-107
Availability: Published in Journal of Experimental Psychology v40 n5 p655-67 Oct 1950.

Descriptors: (*Numbers, Approximation (Mathematics)), (*Scale, Numbers), Display systems, Cathode ray tubes, Visual signals, Applied psychology.

The experiment was designed to get information on the relationship between accuracy of visual interpolation and the numerical system assigned to scale markers. The visual problem presented to the subject contained a number of short arcs (called localization points) scattered in and concentric with a pattern of four equally-spaced, concentric circles which served as scale markers. The subject's task was to estimate the position of each localization point in the field relative to the center of the display and to the scale markers between which it fell. Eleven different numerical scale units were tested: 1,000, 2,000, 3,000, 4,000, 5,000, 6,000, 7,000, 8,000, 9,000, 10,000 yards, and 2.5 miles. Relative errors of estimation were analyzed into two components, constant errors and variable errors, the former being expressed by the mean, the latter by standard deviations around the mean. Differences between the constant errors and variable errors for the different scales were found to be highly significant.

AD-640 095 **Field 5J**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md.
THE VISUAL DISCRIMINATION OF GEOMETRIC FORMS,
by Roland Carl Casperson. 17 Jul 50, 14p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-108
Availability: Published in Journal of Experimental Psychology v40 n5 p668-81 Oct 1950.

Descriptors: (*Target discrimination, *Geometric forms), (*Visual perception, Geometric forms), Mathematical prediction, Statistical analysis, Visual signals, Display systems.

Area was found to be the best measure of discriminability for ellipses and triangles. Maximum dimension best predicted discriminability for rectangles and diamonds. Perimeter was the best predictor for stars and crosses. As a group the six basic forms can be evaluated best for discriminability when their maximum dimensions are known. Prediction of discriminability for the total of 30 forms and figures was best accomplished on the basis of their perimeters. Comparison of the relative discriminability f the six forms used in this experiment in terms of thresholds and total percent of correct reports confirms earlier findings that the circle and elliptical shapes in general are not very easy to identify. These results indicate that the Gestalt principle of 'simplicity' is inadequate as a predictor of the relative discriminability of ellipses, rectangles, triangles, diamonds, crosses, and stars such as those used in this experiment. A comparison of the variance contributed by the 20 Os with the variance due to form differences substantiates the hypothesis that forms do differ in their discriminability and that differences among individuals making the discrimination are small compared to these form differences. (Author)

AD-640 096 **Field 5J**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Inst. for Cooperative Research.
SOME EFFECTS OF SHAPE ON APPARENT BRIGHTNESS,
by R. M. Hanes. 7 Jul 50, 5p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-109
Availability: Published in Journal of Experimental Psychology v40 n5 p650-4 Oct 1950.

Descriptors: (*Visual perception, Geometric forms), (*Geometric forms, Brightness), Target recognition, Intensity, Thresholds (Physiology).

The influence of shape or form on apparent brightness has been investigated for three geometrical forms (square, triangle, and circle) at three intensity levels (0.1, 10, and 100 mL.). Comparisons were made only among forms of equal area. The triangle and circle, on the average, exhibited an enhanced brightness relative to the square. These differences do not, however, remain the same for all sizes and all brightness levels. In other words, there are some significant interactions among the three factors. When the two smaller sizes are considered the triangle has a consistently higher apparent brightness than do the other two. For the

largest size the circle appears to be brightest. While the results can be partially explained in terms of marginal contrast and apparent size, no simple single explanation seems adequate to account for the results. (Author)

AD-640 098 **Field 5J**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
DISCRIMINABILITY BETWEEN GEOMETRIC FIGURES UNDER COMPLEX CONDITIONS,
by R. B. Sleight, and G. H. Mowbray. 9 Nov 50, 7p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-111
Availability: Published in Journal of Psychology v31 p121-7 1951.

Descriptors: (*Target discrimination, *Geometric forms), (*Visual perception, Geometric forms), Visual signals, Display systems, Stress (Psychology), Statistical analysis.

When the task of discriminating rectangles from squares and ellipses from circles was incorporated in a problem of rapid and accurate reading of bearing and range target information, it was seen that thresholds for shape distortion were greatly increased over those found under simpler conditions. The threshold at the 50 per cent correct report level for distortion of a square was found to be 10 times that previously reported, viz., a 14 per cent increment under the complex conditions of this experiment. Using a criterion of 95 per cent correct reports, it was found that a one-inch square figure must be elongated 27 per cent in order to be identified as a rectangle; a circle must be elongated 20 per cent in the major dimension to be identified as an ellipse. There is evidence that the horizontal dimension of rectangular figures was consistently judged longer than it actually was physically; a finding which is at variance with the classical statement of the horizontal-vertical illusion. (Author)

AD-640 099 **Field 5J**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Dept. of Psychology.
STUDIES OF MANUAL ROTARY POSITIONING MOVEMENTS: II. THE ACCURACY OF ESTIMATING THE POSITION OF AN INDICATOR KNOB,
by Alphonse Chapanis. 11 Oct 50, 7p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-117
See also AD-639 864.
Availability: Published in Journal of Psychology v31 p65-71 1951.

Descriptors: (*Perception (Psychology), Performance (Human)), Statistical analysis, Errors, Reliability.

The experiment measured the precision with which subjects could estimate the angular settings of an indicator knob. Ten subjects made 180 judgments for settings at each degree from 0 (the horizontal) through 90 (vertical) to 180 degrees. The results show: (1) Subjects tend to overestimate the angular positions of settings between 0 and 90 degrees and underestimate the settings between 90 and 180 degrees. This means that the subjects perceived the knob as being more nearly vertical than it really was. This finding is consistent with the results of an earlier experiment in which the subjects set the indicator knob to various angles. In that experiment settings were also made as though the subjects perceived the knob as being more nearly vertical than its true position. (2) Variable errors for estimates of settings were relatively small around the 0 and 90 degree positions. They increased markedly for angles between these two settings. The variable errors for estimates are, in general, about 1 1/2 times greater than the variable errors for settings. (3) The subjects showed marked number preferences in making their estimates and this undoubtedly increased the variable errors found in this experiment. The precise contribution of these number preferences cannot be evaluated with the data available. (Author)

AD-640 161 **Field 5J**
CFSTI Prices: HC$4.00 MF$0.75
Human Engineering Labs., Aberdeen Proving Ground, Md.
GROUP BEHAVIOR IN CONFINEMENT: REVIEW AND ANNOTATED BIBLIOGRAPHY.
Technical memo.,
by Alfreda R. Honingfeld. Oct 65, 116p TM-14-65

Descriptors: (*Confinement (Psychology), Performance (Human)), Human engineering, Group dynamics, Confined environments, Sensory deprivation, Performance tests, Psychomotor tests, Stress (Psychology), Illusions, Fallout shelters, Space simulation chambers, Abstracts, Reviews, Bibliographies.

Field and laboratory confinement studies were reviewed to evaluate existing information and to identify areas where future research is needed. The studies reviewed deal with confining two or more people in a restricted space for a prolonged period of time: particular attention was devoted to how such conditions degrade performance. Few of the studies bear on the Army's chief interest in confinement: how men will perform during and after prolonged confinement in armored vehicles. The review concludes by recommending ways to make future studies of confinement more directly relevant to the Army's interest. (Author)

AD-640 202 **Field 5J**
Not available from CFSTI.
Wisconsin Univ., Madison. Dept. of Sociology.
DIFFICULTY FACTORS AND THE USE OF r SUB PHI,
by Edgar F. Borgatta. 18 Nov 63, 18p
Grant AF-AFOSR-62-16
Proj. AF-9778
Task 977802
AFOSR-66-0287
Availability: Published in Journal of General Psychology v73 p321-37 1965.

Descriptors: (*Psychometrics, *Statistical functions), Factor analysis.

AD-640 217 **Field 5J, 12A**
CFSTI Prices: HC$1.00 MF$0.50
Nebraska Univ., Lincoln.
ON A NEW PROPERTY OF PBIB DESIGNS USEFUL IN AN APPLICATION OF MANOVA IN PSYCHOMETRICS.
Interim rept. Sep 65-Aug 66,
by J. N. Srivastava, and R. L. Maik. Jun 66, 17p
Contract AF 33 (615)-3231
Proj. AF-7071
ARL-66-0105

Descriptors: (*Psychometrics, *Multivariate analysis), (*Test construction (Psychology), Experimental design), Matrix algebra, Statistical tests.

The work includes an interesting property of a partially balanced association scheme, which is important in an application of multivariate analysis of variance, discussed earlier in a paper by Srivastava ('on testing hypotheses regarding a class of covariance structures').

AD-640 274 **Field 5J**
Not available from CFSTI.
Delaware Univ., Newark.
DOGMATISM AND PREDECISIONAL INFORMATION SEARCH.
Doctoral thesis,
by Barbara H. Long, and Robert C. Ziller. 3 Aug 64, 5p
Grant AF-AFOSR-62-95
Proj. AF-9778
Task 977802
AFOSR-66-1150
Availability: Published in Journal of Applied Psychology v49 n5 p376-8 1965.

Descriptors: (*Decision making, Psychometrics), Defense mechanisms (Psychology), Search theory.

Rokeach's Dogmatism Scale and 4 decision measures of tendencies to reserve judgment were administered to 72 freshmen women. A significant negative relationship was found between dogmatism and each of the 4 decision measures. The nondogmatic individual tended to delay decision and engage in predecisional search, to require more time for psychophysical judgments, and to respond 'don't know' to statements of opinion under conditions of inadequate information. Accordingly, dogmatism was interpreted as a defense mechanism which interferes with processing of predecisional information. (Author)

AD-640 276 **Field 5J, 5K**
Not available from CFSTI.
Delaware Univ., Newark.
TOWARD A THEORY OF OPEN AND CLOSED GROUPS,
by Robert C. Ziller. 8 Dec 64, 22p
Grant AF-AFOSR-62-95
Proj. AF-9778
Task 977802
AFOSR-66-1168
Availability: Published in Psychological Bulletin v64 n3 p164-82 Sep 1965.

Descriptors: (*Group dynamics, Behavior), (*Behavior, *Social psychology), Creativity, Leadership, Decision making, Stability.

Four characteristics differentiate groups in which membership is in a constant state of flux (open groups) as opposed to groups in which the membership is relatively stable (closed groups): time, perspective, equilibrium, frame of reference, and changing group membership. The significance of these characteristics for social behavior was explored. A number of tested and testable propositions concerning group stability and social behavior emerged from a rapprochement of research, relevant sub-theories, and concepts associated with open and closed-group behavior. The failure to consider the dimension of group stability in most previous social-psychological research poses a question concerning the generality of social-psychological theories which are based upon research which ignores the pervasive dimension of group stability. (Author)

AD-640 279 **Field 5J, 5K**
Not available from CFSTI.
New York Univ., N. Y. Research Center for Human Relations.
INFLUENCE OF JUDGES' ATTITUDES ON RATINGS OF FAVORABLENESS OF STATEMENTS ABOUT A SOCIAL GROUP,
by Marisa Zavalloni, and Stuart W. Cook. 3 Jul 63, 14p
Grant AF-AFOSR-62-176
Proj. AF-9778
Task 977802
AFOSR-66-1160
Availability: Published in Journal of Personality and Social Psychology v1 n1 p43-54 Jan 1965.

Descriptors: (*Attitudes, *Sociometrics), (*Social psychology, Attitudes), Group dynamics, Personality.

Replication of a study of Hovland and Sherif confirmed their central hypothesis, that scale values assigned to items are influenced by raters' attitudes. However, the present findings require modification of their more specific hypotheses in 3 respects: (a) ratings by 5 criterion groups spaced along an attitude continuum show a regular order, whereas Hovland and Sherif hypothesized that ratings are influenced by attitudes only in the case

of raters with extreme attitudes and high involvement; (b) ratings of unfavorable as well as of neutral items are influenced by raters' attitudes; (c) the prediction that extreme judges make fine discriminations at their own end of the scale and lump together items at the other end is supported only with respect to unfavorable items. (Author)

AD-640 404 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Ohio State Univ., Columbus. Human Performance Center.
THE EFFECT OF TEAM FEEDBACK ON INDIVIDUAL PERFORMANCE AND SELF-EVALUATION.
Final scientific rept.,
by William A. Johnston, and William C. Howell.
Sep 66, 15p
Grant AF-AFOSR-985-66
Proj. AF-9778
Task 977802
AFOSR-66-1948

Descriptors: (*Group dynamics, Feedback), (*Performance (Human), Group dynamics), Simulation, Tracking.

Identifiers: Evaluation.

The research program was designed to assess the role of team feedback in small-group activity. Team feedback was simulated by telling the subject that he had a partner and that feedback reflected his team performance relative to average performance. Actually, feedback represented the subject's individual tracking performance relative to a criterion, the stringency of which was manipulated experimentally. A stringent criterion produced poor feedback as though the subject had a poor partner, and a lenient criterion simulated a good partner. In general, the subjects performed best with good partners (lenient criteria). If one partner was replaced by a poorer partner, the subject's performance was retarded. The subjects accepted the credit for good team scores induced by a lenient criterion, but attributed the blame for poor scores wrought by a stringent criterion to their contrived partners. The data support the thesis that team feedback is an important determinant of individual behavior in the small group. (Author)

AD-640 499 **Field 5J**
CFSTI Prices: HC$3.00 MF$0.75
Michigan Univ., Ann Arbor. Dept. of Psychology.
HUMAN PERFORMANCE IN LOW SIGNAL PROBABILITY TASKS.
Technical rept.,
by Patrick A. Lucas. Aug 66, 88p
Contract AF 49 (638)-1710
AFOSR-66-2057

Descriptors: (*Performance (Human), *Detection), Attention, Signals, Probability.

An extension of the theory of signal detection (TSD) to psychophysical tasks involving low probability signals and free response data is developed and evaluated. Emphasis is placed on tasks for which the observer is asychronous; that is, the observer cannot perform optimally by making independent decisions on non-overlapping intervals of time. A mathematical model of asynchronous observation in a class of temporally unstructured tasks with Neyman-Pearson solutions for optimal fixed response rate is used to describe detection performance by human observers. Data from an experiment show (1) a conservative fixed response rate, (2) a constant hit rate, and (3) inter-response distributions for false alarms with a general exponential shape showing periodic modes. Detection efficiency in the temporally unstructured task was approximately one tenth of alerted detection efficiency for two observers and one half of alerted detection efficiency for a third observer. Points on the obtained ROC curve are fit better by an inefficient asynchronous observer than by synchronous power law observers. A post hoc analysis of the effect of training showed an effect for distribution of responses in time but showed no effect of an improvement in memory for the signal. It is concluded that highly trained observers detecting important signals show constant efficiency over observation periods of 30 to 45 min. (Author)

AD-640 523 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Louisville Univ., Ky. Dept. of Psychology and Social Anthropology.
SCANNING AND CLUSTERING: AN EXPLORATORY INVESTIGATION OF RETRIEVAL STRATEGIES IN FREE RECALL.
Technical rept.,
by John A. Robinson. 20 Jul 66, 13p TR-2
Grant AF-AFOSR-1008-66
Proj. AF-9778
Task 977801
AFOSR-66-1827

Descriptors: (*Recall, Word association), Classification.

Identifiers: Words, Clustering (Psychology).

Two retrieval strategies used by Ss in their recall of a categorizeable word list were identified and contrasted: clustering and scanning. Clustering consists of retrieving categories, and emptying them of the appropriate items. Scanning consists of searching through the ordered array of categories, retrieving one or two items per category, and cycling back through the array until all of the items of the list have been retrieved. It was found that, in terms of number of words correctly recalled, clustering was a more efficient strategy. (Author)

N66-29570 **Field 5J**
CFSTI Prices HC$3.00 MF$0.75
Michigan Univ., Ann Arbor. Dept. Of Psychology.
BRAIN CENTERS AND POSITIVE REINFORCEMENT.
by J. Olds. 1963, 81p NASA-CR-75896
Grant NSG-626
Presented At The 27th Intern. Congr. Of Psychology, Washington, Aug. 1963 Submitted For Publication

Descriptors: *Animal study, *Brain, *Electric stimulus, *Psychology (gen), Animal, Electric, Positive, Rat, Reinforcement, Response, Stimulus, Study.

For abstract, see S 04 16.

AD-458 298 **See Field 6P**

AD-639 630 **See Field 6N**

AD-639 834 **See Field 6P**

AD-639 854 **See Field 5E**

AD-639 868 **See Field 5I**

AD-640 061 **See Field 17I**

AD-640 082 **See Field 17I**

AD-640 085 **See Field 6P**

AD-640 131 **See Field 6P**

AD-640 146 **See Field 5K**

AD-640 191 **See Field 5K**

AD-640 277 **See Field 5K**

AD-640 446 **See Field 5I**

AD-640 450 **See Field 5I**

N66-28271 **See Field 6D**

PB-173 128 **See Field 5B**

5K. SOCIOLOGY

AD-640 146 **Field 5K, 5J, 5I**
CFSTI Prices: HC$2.00 MF$0.50
Hawaii Univ., Honolulu. East-West Center for Cultural Exchange.
CULTURAL INFLUENCES ON ORGANIZATIONS: PTA'S IN JAPAN, HAWAII AND MAINLAND U.S.A.
Technical rept.,
by F. K. Berrien, Shinkuro Iwahara, and Abe Arkoff. Aug 66, 34p TR-2
Contract Nonr-4806 (00)
Prepared in cooperation with Rutgers - The State Univ., New Brunswick, and Tokyo Univ., (Japan).

Descriptors: (*Culture, *Social psychology), (*Japan, Social psychology), (*United States, Social psychology), (*Hawaii, Social psychology), Leadership, Education, Personality, Public opinion, Sociology.

Local PTA's in continental United States, Honolulu, and Tokyo, were surveyed to determine the nature of their leadership, the kinds of problems they confront, and the degree of autonomy each displayed. The study was the second aimed to discover to what extent Japanese community-based organizations reveal evidences of centralized vs. distributed control and related behavioral evidences of personal preferences that discriminate between Japanese and Americans. The results suggest that PTA's in Japan, more than in the USA, are led by persons who have attained, in other activities, a recognized leadership status. The frequency and type of meetings held are consistent with the personal preferences of Americans for less autonomy. The Japanese tend more than the Americans to concentrate attention and resources on the problems of their own school with correspondingly less concern with issues extending to higher levels in the PTA or educational hierarchy. In many of these respects (number of meetings, status of leadership, and dispersion of concerns), the Hawaiian associations fell between the mainland Americans and the Japanese. (Author)

AD-640 191 **Field 5K, 5J**
CFSTI Prices: HC$1.00 MF$0.50
Wisconsin Univ., Madison.
INFLUENCE OF CERTAIN CULTURAL AND CONTENT VARIABLES ON THE EFFECTIVENESS OF PERSUASIVE COMMUNICATIONS IN THE INTERNATIONAL FIELD.
Final rept.,
by S. Watson Dun. 15 Sep 66, 18p
Contract Nonr-1202 (24)
Proj. NR-177-287

Descriptors: (*Culture, Social communication), (*Social communication, Effectiveness), Attitudes, Public opinion, Sociometrics.

Identifiers: Persuasive communications.

The case studies and experimental investigations indicated that a successful persuasive message is more transferable from one culture to another than much of the current literature (both theoretical and pragmatic) would indicate, at least with an upper middle class urban sample in one well-developed Western European country and one developing Middle Eastern country. There was no evidence that a persuasive message was more effective (in terms of attitude change, comprehension of message and preference for the product) if it were attributed to a source from the country in which the message was disseminated or if it featured visually people of that country. Only limited evidence suggested that an original message composed by a native of the particular country was superior to a good idiomatic translation of one proven successful in the United States. A follow-up experiment indicated that remembrance of the message was low in France, not quite so low in Egypt. Another set of experiments conducted in the United States suggested that a country can under certain circumstances serve as a national reference group and

can influence attitudes of respondents toward the persuasive message. Both series of experiments and the case studies suggested that the generality of the message was a variable of some significance. (Author)

AD-640 277 **Field 5K, 5J**
Not available from CFSTI.
New York Univ., N. Y.
RATINGS OF FAVORABLENESS OF STATEMENTS ABOUT A SOCIAL GROUP AS AN INDICATOR OF ATTITUDE TOWARD THE GROUP,
by Claire Selltiz, Harold Edrich, and Stuart W. Cook. 18 May 65, 10p
Grant AF-AFOSR-62-176
Proj. AF-9778
Task 977802
AFOSR-66-1159
Availability: Published in Journal of Personality and Social Psychology v2 n3 p408-15 1965.

Descriptors: (*Attitudes, Sociometrics), Social psychology, Group dynamics.

Identifiers: Negroes.

Earlier studies reporting effects of judges' attitudes on ratings of favorableness of statements have suggested the possible usefulness of such ratings as disguised attitude measures. Studies in which Negroes have been the attitudinal object have used a set of statements a high proportion of which are unfavorable by current standards. In the hope of making the technique more sensitive as an indicator of attitude, a new set of statements about the position of Negroes was developed, representing a more symmetrical distribution of favorable and unfavorable items. These were administered in 3 different geographical regions to groups of Ss differing in attitude toward Negroes. 2 criteria of judges' attitudes were used: (a) membership in organizations such that it seemed reasonable to suppose that many of the members would hold specified attitudes about race relations; and (b) scores on a self-report inventory of attitude toward Negroes. Within each region, separate analyses using these 2 criteria for classifying judges yielded similar results: scale values assigned to statements by judges with different attitudes differed significantly. Difference in ratings of the unfavorable and intermediate statements were systematic, with the prointegration Ss rating them as more unfavorable. (Author)

AD-640 296 **Field 5K**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
A USE OF SIMULATION FOR THE STUDY OF FUTURE VALUES,
by Olaf Helmer. Sep 66, 37p P-3443
Presented at a Conference on the Effect of Technological Change on American Values held in Pittsburgh, Pennsylvania, September 16-18 1966.

Descriptors: (*Sociology, Simulation), Decision making, Social sciences, Attitudes, Probability, Public opinion, United States.

A brief description is given of the design of a simulation workshop on the subject of the effect of technological change on American values. The exercise is directly related to a set of twenty potential future technological and environmental developments which are described.

AD-640 449 **Field 5K**
Not available from CFSTI.
McGill Univ., Montreal (Quebec).
THE ESKIMO OF NORTH ALASKA,
by Norman A. Chance. Apr 66, 120p
Availability: Hard copy available from Slolt, Rinehart and Winston, Inc., 383 Madison Ave., New York, N. Y., 10017.

Descriptors: (*Anthropology, *Alaska), Humans, Social sciences, Ecology, Attitudes, Children, Infants, Adolescents, Adults, Economics, Culture, Religion, Leadership, Law, Personality.

Identifiers: Eskimos.

AD-640 276 **See Field 5J**

AD-640 279 **See Field 5J**

AD-640 300 **See Field 5C**

6A. BIOCHEMISTRY

AD-639 762 **Field 6A, 6S**
Not available from CFSTI.
Army Medical Research and Nutrition Lab., Denver, Colo.
ELEVATED PBI, FREE THYROXINE, AND PLASMA PROTEIN CONCENTRATION IN MAN AT HIGH ALTITUDE,
by Martin I. Surks. 6 Dec 65, 7p
Availability: Published in Journal of Applied Physiology v21 n4 p1185-90 Jul 1966.

Descriptors: (*Blood chemistry, *High altitude), Thyroxine, Blood proteins, Globulins, Electrophoresis, Blood plasma, Dehydration, Biosynthesis, Degradation, Acclimatization, Iodine.

Identifiers: Protein-bound iodine.

Various aspects of thyroxine binding by plasma proteins have been studied in eight sea-level residents before, during, and after 28 days exposure to 14,100 ft altitude. Mean plasma concentration of protein-bound iodine and total protein and the binding capacity of thyroxine-binding globulin were elevated within 3 days, reached a maximum after 9 days, and returned toward low-altitude values between 12-15 days at altitude. They reached control levels within 4 days after descending to sea level. In spite of an increased intensity of thyroxine binding by plasma proteins, the concentration of plasma free thyroxine was increased at altitude. Since the electrophoretic distribution of plasma proteins was unaltered, plasma dehydration in the initial phase of altitude exposure was concluded to be responsible for most of the observed alterations in thyroxine binding. A decrease in mean binding capacity of thyroxine-binding prealbumin is interpreted to reflect changes in protein synthesis and/or degradation which may also occur in this environment. (Author)

AD-639 766 **Field 6A**
Not available from CFSTI.
Army Medical Research and Nutrition Lab., Denver, Colo.
A SIMPLIFIED METHOD FOR THE ISOLATION OF URINARY ASCORBIC ACID AS THE 2,4-DINITROPHENYLOSAZONE,
by J. C. Saari, R. M. Baker, and H. E. Sauberlich. 4 Mar 66, 3p
Availability: Published in Analytical Biochemistry v 15 n3 p537-9 Jun 1966.

Descriptors: (*Ascorbic acid, Chemical analysis), Hydrazine derivatives, Quinones, Oxidation, Plastics, Acetonitriles, Recrystallization, Solvents.

Identifiers: Dinitrophenyl hydrazine.

The report describes the integration of several existing ascorbic acid analytical procedures resulting in a simple technique for the isolation of urinary radioactive ascorbic acid-DNPH derivatives in good yields. The improvements in this method result from: (a) use of a mild oxidizing agent (p-benzoquinone) to oxidize the ascorbic acid prior to derivative formation; (b) substitution of Dowex 1 (acetate form) resin for Amberlite IR-4B (OH form); and (c) use of acetonitrile as the recrystallizing solvent for the DNPH derivative. (Author)

AD-639 768 **Field 6A, 6P**
Not available from CFSTI.
Army Medical Research and Nutrition Lab., Denver, Colo.
GLUCONEOGENESIS IN KIDNEY CORTEX SLICES FROM COLD-EXPOSED RATS AND HAMSTERS,
by Roy F. Burlington. 15 Oct 65, 4p
Availability: Published in Comp. Biochem. Physiol. v17 p1049-52 1966.

Descriptors: (*Glucose, Biosynthesis), (*Heat production (Biology), Glucose), (*Acclimatization, Heat production (Biology)), (*Metabolism, Adaptation (Physiology)), Pyruvates, Lactates, Glycerols, Glutaric acids, Glutamic acid, Aspartic acid, Kidneys, Rats, Hamsters.

The rate of gluconeogenesis from pyruvate, L-lactate, glycerol, alpha-ketoglutarate, L-glutamate and L-aspartate was measured in kidney cortex slices prepared from control and cold-exposed albino rats and hamster (Mesocricetus auratus). The capacity for gluconeogenesis was increased in both species after 2 weeks' exposure to 5 plus or minus 1C, thus indicating an adaptive reaction to cold, in that glucose serves as a major source of energy for increased heat production in cold-acclimatized animals. (Author)

AD-639 775 **Field 6A, 6E**
Not available from CFSTI.
Walter Reed Army Inst. of Research, Washington, D. C.
STIMULATION OF THE UTILIZATION OF 1-14C-GLUCOSE IN CHICKEN RED BLOOD CELLS INFECTED WITH PLASMODIUM GALLINACEUM,
by Yaye F. Herman, Ronald A. Ward, and Robert H. Herman. 1964, 5p
Availability: Published in American Journal of Tropical Medicine and Hygiene v15 n3 p276-80 1966.

Descriptors: (*Plasmodium, Erythrocytes), (*Erythrocytes, Saccharide phosphates), (*Saccharide phosphates, Plasmodium), Diseases, Chickens, Metabolism, Glucose, Carbon dioxide, Pyridines, Nucleotides, Organic phosphorus compounds.

Identifiers: Triphosphopyridine nucleotide.

Malaria-infected chicken erythrocytes exhibited a marked increase in the metabolism of 1-14C-glucose to 14CO2. Addition of the cofactors, TPN or ATP, to red cell and parasite total hemolysate usually accelerated CO2 production. Virtually all activity was confined to the supernatant fluid as compared to the stroma. A pentose phosphate pathway is apparently absent in Plasmodium gallinaceum, and the parasite apparently utilizes this pathway in the host erythrocyte. (Author)

AD-639 778 **Field 6A**
Not available from CFSTI.
National Research Council of Canada, Ottawa (Ontario). Div. of Biosciences.
REASSOCIATION OF DISSOCIATED STRUCTURAL PROTEIN WITH RIBOSOMAL PARTICLES OF AN EXTREMELY HALOPHILIC BACTERIUM.
Revised ed.,
by S. T. Bayley. 21 Mar 66, 12p
Revision of manuscript submitted 6 Dec 1965.
Availability: Published in J. Mol. Biol v18 p330-8 1966.

Descriptors: (*Ribosomes, Dissociation), Proteins, Biosynthesis, Ribonucleic acids, Chemical precipitation, Centrifuge separation, Bacteria, Canada.

Identifiers: Halobacterium cutirubrium.

Ribosomes of Halobacterium cutirubrum are stable in 4m-KCl-0.1 m-MgCl2-0.01 m-tris. By centrifuging them out of this medium and resuspending them in 0.005 m-tris-MgCl2-KCl, these ribosomes were dissociated into soluble structural pro-

tein and RNA-rich particles. The reassociation of this dissociated protein with the RNA-rich particles was examined on raising the concentration of salt to the original high level. Chemical analyses showed that, on the average, reassociation did not compensate for the loss of protein due to dissociation. This was confirmed by gradient centrifugation in CsCl. Although the extent of dissociation and reassociation was variable, the reconstituted particles in every case sedimented at rates identical, within experimental error, to those of the normal 70s, 52s and 31 s ribosomal particles. However, the relative proportions of the three classes of sedimenting particle were changed by dissociation and reconstitution; after extensive dissociation, the reconstitution of 52s particles was hindered more than reconstitution of 31s. Without reassociated protein, RNA-rich particles precipitated at high salt concentrations. It is possible that reassociation of ribosomal protein occurs mainly at the peripheries of the RNA-rich particles. The configuration of the ribosomal RNA in the various ribonucleoprotein particles studied appears to be determined by their ionic environment rather than by the associated protein. (Author)

AD-639 794 **Field 6A**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
FORMATION OF METHYLENE BRIDGES IN THE REACTION OF RIBONUCLEIC ACID WITH FORMALDEHYDE,
by M. Ya. Feldman. Jul 65, 10p Trans-1475
TT-66-62373
Trans. of Biokhimiya (USSR), v30 n1 p203-7 1965.

Descriptors: (*Ribonucleic acids, Condensation reactions), (*Formaldehyde, Ribonucleic acids), Nucleosides, Chemical bonds, Chromatographic analysis, Spectra (Visible +ultraviolet), Hydrolysis, USSR.

Identifiers: Methylene bis (adenosine).

From RNA, processed with formaldehyde, a product of the condensation of adenosine with formaldehyde was isolated. It was identified by chromatographic mobility and UV spectrum as methylene-bis-adenosine. In the alkaline hydrolyzate of RNA, treated with C14H2O, C14-methylene-bis-adenylic acid was detected chromatographically. Thus, experimental confirmation was obtained of the earlier expressed supposition concerning the formation of methylene bridges in the reaction of RNA with formaldehyde. (Author)

AD-639 799 **Field 6A**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
PURIFICATION OF FLUORESCENT CONJUGATES FROM FREE FLUOROCHROME WITH THE AID OF ION-EXCHANGE RESINS. REPORT II. COMPARATIVE RESULTS OF FLUORESCENT ANTIBODY PURIFICATION BY THE METHODS OF ION EXCHANGE AND FILTRATION THROUGH GEL,
by I. O. Dashkevich, G. M. Maiboroda, and R. B. Goldin. Jul 65, 9p Trans-1608
TT-66-62377
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR), v42 n2 p116-20 1965.

Descriptors: (*Fluorescent antibody techniques, Ion exchange), (*Proteins (Conjugated), Purification), Labeled substances, Gels, Immune serums, USSR.

Conclusions: Purification of luminescent antibodies with the help of anion-exchange resin and sephadex produces practically the same results. A deficiency in purification with anion-exchange resins is connected with the necessity of the preliminary dialysis of the conjugates, which somewhat prolongs the time for purification; a deficiency of sephadex is its great expense and the considerable dilution of the solutions of purified antibodies. The extreme low price and availability of ion-exchange resins, and also their insignificant expenditure in work make it possible to recommend the latter, especially when it is necessary to purify significant amounts of luminescent antibodies, and this may have special importance under industrial conditions. (Author)

AD-639 851 **Field 6A, 6M**
Not available from CFSTI.
Centre D'Enseignement et de Recherches des Industries Alimentaires et Chimiques, Brussels (Belgium).
NOUVEAUX MUTANTS DE REGULATION DE LA SYNTHESE DE L'ARN (New Mutants in the Regulation of RNA Synthesis),
by R. Lavalle. 1965, 6p
Grant AF-EOAR-16-65
Proj. AF-9777
Task 977701
AFOSR-66-0742
Text in French.
Availability: Published in Bull. Soc. Chim. Biol. v47 n8-9 p1568-70 1965.

Descriptors: (*Escherichia coli, Mutations), (*Mutations, Ribonucleic acids), (*Ribonucleic acids, Biosynthesis), Amino acids.

Three new mutants of E. coli have been found which can continue to synthesize appreciable quantities of RNA in the absence of an essential amino acid. These mutants are different from the 'relaxed' strain 58161. The properties of RNA synthesis by these mutants are discussed. (Author)

AD-639 869 **Field 6A**
Not available from CFSTI.
RIAS, Inc., Baltimore, Md.
THE REDUCING POWER GENERATED IN PHOTOACT I OF PHOTOSYNTHESIS,
by Bessel Kok, Hans J. Rurainski, and Olga V. H. Owens. 16 Mar 65, 12p
Contracts AF 49 (638)-947, NASw-747
Proj. AF-9777
Task 977701
AFOSR-66-0838
Grant PHS-PH-43-63-36.
Availability: Published in Biochim. Biophys. Acta v109 p347-56 1965.

Descriptors: (*Photosynthesis, Reduction (Chemistry)), Chloroplasts, Oxidation-reduction reactions, Dyes, Phosphorylation, Oxygen.

The photoreduction of viologen dyes having Eo' values between -0.32 and -0.74 V was studied with isolated chloroplasts. Compared to ferricyanide, all compounds mediated photosynthetic oxygen evolution and photophosphorylation with equal rate and efficiency. The concentration required for maxium stimulation increased with decreasing normal potential. Under anaerobic conditions, an accumulation of the reduced viologens could be observed directly. Despite the interference of a back reaction with photosynthetically evolved O2' compounds with Eo'>-0.55 could be reduced completely, lower-potential agents partially. It is concluded that the normal potential of the strong reductant, generated in the long-wave photoact of photosynthesis is as low or lower than -0.7V. (Author)

AD-639 870 **Field 6A**
Not available from CFSTI.
RIAS, Inc., Baltimore, Md.
REDUCING POWER GENERATED IN THE SECOND PHOTOACT OF PHOTOSYNTHESIS,
by Bessel Kok, and E. Anne Datko. 28 May 65, 9p
Contracts AF 49 (638)-947, NASw-747
Proj. AF-9777
Task 977701
AFOSR-66-0290
Grant PHS-PH-43-63-36.
Availability: Published in Plant Physiology v40 n6 p1171-7 Nov 1965.

Descriptors: (*Photosynthesis, Reduction (Chemistry)), Algae, Plants (Botany), Chlorophylls, Cyanides, Quinones.

The photochemical activities of cell free preparations of Bishop's Scenedesmus mutant no. 8, of the wild type strain and of spinach chloroplasts was compared. The data were largely consistent with the assumption that the mutant lacks photosystem I of photosynthesis. Whereas high potential oxidants such as ferricyanide and benzoquinone sustained oxygen evolution with good yield, lower potential oxidants were reduced with a poor quantum efficiency. A comparative study of a number of oxidants having different normal potentials was made. A distinct transition from high to low quantum yield occurred at a potential value of E' approx = + 0.18 volt. It was assumed that this potential is equal or close to the normal potential of the primary photoreductant generated inphotoact II of photosynthesis. (Author)

AD-640 361 **Field 6A**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
CHEMICAL AND PHYSICAL VARIABLES AFFECTING THE PROPERTIES OF FLUORESCEIN ISOTHIOCYANATE AND ITS PROTEIN CONJUGATES,
by Maxwell R. Klugerman. 14 Apr 65, 10p
Availability: Published in The Journal of Immunology v95 n6 p1165-73 1966.

Descriptors: (*Fluorescent antibody techniques, *Thiocyanates), pH, Temperature, Time, Buffers, Proteins (Conjugated), Fluorescence, Antigens +antibodies, Gamma globulin, Labeled substances.

The effect of pH, time, temperature, and buffer systems on solutions of fluorescein isothiocyanate and its protein conjugates was examined fluorometrically. The fluorescence of the isothiocyanate and of the protein conjugate was maximal at about pH 8.7 and pH 10.7, respectively. The stability of their fluorescence above pH 7 was affected adversely by increases in pH or temperature. The protein conjugate, however, showed maximum stability at pH 10.5 and above. The type of buffer (carbonate, phosphate, borate, Tris and barbiturate) did not affect the fluorescence of the free dye significantly. On the other hand, increasing the molarity of the buffer caused a decrease in stability of fluorescence of the free dye but did not seriously affect the fluorescence of the conjugate. The binding of fluorescein isothiocyanate to protein resulted in a loss of fluorescence efficiency, the extent of loss being dependent upon the pH of measurement. (Author)

N66-27037 **Field 6A**
CFSTI Prices HC$1.00 MF$0.50
Aeronutronic, Newport Beach, Calif.
EXPERIMENTAL STUDIES FOR THE DETECTION OF PROTEIN IN TRACE AMOUNTS QUARTERLY STATUS REPORT, 1 MAR. - 31 MAY 1965.
by J. D. Albert, E. R. Walwick, and B. R. Zalite. 1965, 6p NASA-CR-64051, U-3156
Contract NASW-770

Descriptors: *Inorganic compound, *Organic material, *Protein, Carbon, Colloid, Compound, Dye, Inorganic, Material, Organic, Polymer, Separation, Soil, Solute, Solution, Water.

For abstract, see S 04 15.

N66-27041 **Field 6A**
CFSTI Prices HC$5.00 MF$1.00
Stanford Univ., Calif. Biophysics Lab.
PHOTOCHEMISTRY OF D L-PHENYLALANINE.
by D. H. Kenyon. Dec 64, 151p NASA-CR-57741, BL-124
Grant NSG-218-62, Contract NIH-GMS-2G-712-C3

Descriptors: *Optical density, *Phenylalanine, *Photochemistry, *Ultraviolet radiation, Benzene, Carbon, Chromatography, Density, Energy, Excitation, Free, Kinetics, Optical, Paper, Photoproduct, Polymer, Radiation, Radical, Ultraviolet.

For abstract, see S 04 15.

N66-27500 **Field 6A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
BIOLOGICAL MECHANISMS OF OXALACETIC ACID DECARBOXYLATION.
Biologicheskiye Mekhanizmy Dekarboksilirovaniya Shchavelevouksusnoy Kisloty
by N. K. Nagradova. May 66, 37p NASA-TT-F-10143
Transl. Into English From Usp. Sovrem. Biol. (Moscow), V. 52, No. 1 (4), 1961 P 3-18

Descriptors: *Carbon dioxide, *Chemical reaction, *Dicarboxylic acid, Acid, Animal, Biotin, Carbon, Cell, Chemical, Decarboxylation, Dioxide, Enzyme, Fixation, Glycogen, Maleic, Metabolism, Oxalacetic, Plant, Reaction, Synthesis, Tissue.

For abstract, see S 04 15.

N66-27930 **Field 6A**
CFSTI Prices HC$1.00 MF$0.50
Missouri Univ., Kansas City. Dept. Of Chemistry.
COMPLETE REACTION STUDIES IN EXOBIOLOGY - THE CHEMISTRY AND PHOTOCHEMISTRY OF NUCLEIC ACID CONSTITUENTS AND RELATED COMPOUNDS, AND THEIR DETECTION, CHARACTERIZATION, AND ISOLATION SEMIANNUAL PROGRESS REPORT NO. 4 (FINAL).
by F. Millich. 31 May 66, 25p NASA-CR-75646
Grant NSG-651

Descriptors: *Fluorescence, *Guanine, *Nucleotide, *Photolysis, *Purine, Azole, Derivative, Dye, Excitation, Exobiology, Isolation, Kinetic, Mechanism, Photometry, Photooxidation, Primary, Product, Sensitivity, Spectrum, Thermal, Tungsten.

For abstract, see S 04 15.

N66-29300 **Field 6A**
CFSTI Prices HC$1.00 MF$0.50
Washington State Univ., Pullman.
STUDY OF INTERMEDIARY METABOLIC PROCESSES IN HYDROGENOMONAS FACILIS PROGRESS REPORT, JAN. - JUN. 1966.
1966, 9p NASA-CR-75863
Contract NGR-48-001-004

Descriptors: *Glutamate, *Hydrogenomonas, *Oxidation, *Radioactive isotope, Acid, Anion, Bicarbonate, Carbon, Carbon 14, Carboxylic, Compound, Fixation, Glycerol, Group, Intermediate, Ion, Isotope, Labelling, Pattern, Phosphorus, Radiation, Ribose.

For abstract, see S 04 16.

N66-29378 **Field 6A**
CFSTI Prices HC$1.00 MF$0.50
Stanford Univ., Calif. Instrumentation Research Lab.
3-METHOXY-DIHYDROFLUORAN-6- O L-6-PHOSPHATE - A FLUOROGENIC SUBSTRATE FOR THE DETECTION OF ENZYMATIC ACTIVITIES.
by E. A. Shneour. 11 May 65, 21p NASA-CR-64015, IRL-1015
Grant NSG-81-60

Descriptors: *Enzyme activity, *Fluorescent emission, *Organic phosphorus compound, *Soil, Acid, Activity, Alkali, Biological, Compound, Control, Data, Detection, Emission, Enzyme, Fluorescence, Hydrolysis, Inorganic, Organic, Oxidation, Phosphorus, Purification, Rate, Solution, Synthesis, Use.

For abstract, see S 04 16.

N66-29379 **Field 6A**
CFSTI Prices HC$1.00 MF$0.50
Stanford Univ., Calif. Biophysics Lab.
MOLECULAR EVOLUTION IN PROTOBIOLOGICAL SYSTEMS FINAL REPORT, DEC. 1, 1961 - NOV. 30, 1964.
by M. S. Blois Jr, and H. H. Pattee. Mar 65, 18p NASA-CR-62532, BL-136
Grant NSG-218-62

Descriptors: *Arc discharge, *Inorganic compound, *Organic compound, *Protobiology, *X-ray irradiation, Arc, Compound, Development, Discharge, Evolution, Identification, Inorganic, Irradiation, Life, Mixture, Molecular, Organic, Product, Simple, System, Theory, X-ray.

For abstract, see S 04 16.

N66-29472 **Field 6A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
FORMATION OF PROPROTEIN AND THERMAL THEORY POLYCONDENSATION OF FREE AMINO ACID.
by K. Harada. Sep 63, 26p NASA-TT-F-8429
Transl. Into English From Tampakushitsu Kakusan Koso (Tokyo), V. 6, 1961 P 65-75 Contrib. No. 142 Of The Oceanographic Inst., Florida State Univ.

Descriptors: *Amino acid, *Condensation, *Protein, *Synthesis, *Thermal energy, Acid, Amino, Biochemistry, Energy, Formation, Free, Protoprotein, Theory, Thermal.

For abstract, see S 04 16.

N66-29708 **Field 6A**
CFSTI Prices HC$2.00 MF$0.50
Martin Co., Baltimore, Md. Research Inst. For Advanced Studies.
PHOTOINHIBITION OF CHLOROPLAST REACTIONS. I - KINETICS AND ACTION SPECTRA.
by L. W. Jones, and B. Kok. 1966, 34p NASA-CR-75984
Contracts NASW-747, AF 41/609/-2369
Submitted For Publication

Descriptors: *Botany, *Chloroplast, *Light absorption, *Photosynthesis, *Pigment, *Plant (biol), Absorption, Activity, Characteristics, Damage, Kinetics, Light, Photochemistry, Spectrum, Ultraviolet.

For abstract, see S 04 16.

N66-29837 **Field 6A**
CFSTI Prices HC$1.00 MF$0.50
National Univ. Of Ireland, Dublin. Unit Of Cell Metabolism.
ACTIVE TRANSPORT OF IONS FINAL SCIENTIFIC REPORT.
by E. J. Conway. 27 Feb 66, 4p AFOSR-66-0717, AD-632305
Contract AF 61/052/-852

Descriptors: *Frog, *Ion, *Sodium, *Transport property, Activity, Barrier, Electron, Energy, Mechanism, Microscope, Muscle, Potassium, Property, Skeleton, Transport.

For abstract, see S 04 16.

N66-35726 **Field 6A**
CFSTI Prices HC$2.00 MF$0.50
Miami Univ., Coral Gables, Fla. Inst. Of Molecular Evolution.
THE TERRESTRIAL ORIGINS OF MACROMOLECULES AND OF CELLS.
by S. W. Fox. 1965, 37p NASA-CR-68594
Grants NSG-689, NSG-173-62
Presented At Colloq. On Elementary Biol. Systems And Abiogenesis, Paris, 23-25 Nov. 1965

Descriptors: *Amino acid, *Biogenesis, *Catalytic activity, *Protein, *Protobiology, Acid, Activity, Amino, Biochemistry, Biology, Catalysis, Cell, Evolution, Generation, Polymer, Proteinoid, Spontaneous.

For abstract, see S 04 21.

N66-36075 **Field 6A**
CFSTI Prices HC$2.00 MF$0.50
Florida State Univ., Tallahassee. Dept. Of Statistics.
DILUTION MODEL - A BAYESIAN APPROACH TECHNICAL REPORT NO. 6.
by A. Petrasovits. 24 Aug 66, 30p NASA-CR-77799
Contract NGR-10-004-029

Descriptors: *Bacteria, *Bayesian statistics, *Density measurement, Density, Design, Dilution, Estimation, Experiment, Liquid, Measurement, Model, Organism, Probability, Statistics.

For abstract, see S 04 21.

UCRL-16880 **Field 6A, 7C**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.
SEMIAUTOMATIC INFRARED ANALYZER FOR SERUM TRIGLYCERIDES AND CHOLESTERYL ESTERS,
by Norman K. Freeman, Edward Lampo, and Alfred A. Windsor. 18 May 66, 14p
Contract W-7405-eng-48

Descriptors: (*Blood serum, *Infrared spectrophotometers).

For abstract, see N 20 19.

AD-639 721 **See Field 6C**

AD-640 179 **See Field 7C**

PB-170 917 **See Field 6O**

6B. BIOENGINEERING

N66-27311 **Field 6B**
CFSTI Prices HC$6.00 MF$1.50
Sperry Gyroscope Co., Great Neck, N. Y.
INTEGRATED SPACECRAFT DISPLAY DEVELOPMENT FINAL REPORT.
May 66, 251p NASA-CR-473
Contract NAS4-385

Descriptors: *Display system, *Projection, *Space simulator, Analog, Display, Guidance, Orientation, Panel, Rendezvous, Simulator, Space, System, Tracking, Visual.

For abstract, see S 04 15.

N66-27539 **Field 6B**
CFSTI Prices HC$2.00 MF$0.50
California Univ., Los Angeles. Space Biology Lab.
ANALYSIS OF BRAIN WAVE RECORDS FROM GEMINI FLIGHT GT-7 BY COMPUTATIONS TO BE USED IN A THIRTY DAY PRIMATE FLIGHT.
by W. R. Adey, R. T. Kado, and D. O. Walter. 1966, 49p NASA-CR-75337
Grants NSG-2503, NSG-502

Descriptors: *Biosatellite, *Data analysis, *Display system, *Electroencephalogram (eeg), Aerospace, Analysis, Astronaut, Bioinstrumentation, Data, Display, Medicine,

Monitor, Monkey, Physiological telemetry, Physiology, System, Telemetry.

For abstract, see S 04 15.

N66-27756 **Field 6B**
CFSTI Prices HC$2.00 MF$0.50
Beckman Instruments, Inc., Fullerton, Calif. Advanced Technology Operations.
RESEARCH INVESTIGATION OF ELECTRICAL DISCHARGE FRAGMENTATION FOR PROTEIN STRUCTURE IDENTIFICATION FINAL REPORT.
by I. Krull, and J. Sternberg. 29 Apr 66, 28p
NASA-CR-75499
Contract NAS2-3193

Descriptors: *Bacteria, *Electric discharge, *Fragmentation, *Life detector, *Pattern recognition, Atmospheric, Chromatography, Composition, Computer, Detection, Discharge, Electric, Gas, Identification, Life, Pattern, Pressure, Program, Protein, Recognition, Structure.

For abstract, see S 04 15.

N66-29207 **Field 6B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
COMPARATIVE MEASUREMENTS OF MAN'S WALKING AND RUNNING GAITS IN EARTH AND SIMULATED LUNAR GRAVITY.
by R. L. Harris, D. E. Hewes, and A. A. Spady Jr. Jun 66, 39p NASA-TN-D-3363
Film Supplement To This Report Is Available On Loan From Langley Research Center

Descriptors: *Earth, *Environment simulation, *Gravitation, *Human performance, *Lunar gravitation, Angular, Coordination, Environment, Gravity, Human, Joint, Knee, Leg, Lunar, Movement, Performance, Run, Simulation, Walking.

For abstract, see S 04 16.

N66-29359 **Field 6B**
CFSTI Prices HC$2.00 MF$0.50
Stanford Univ., Calif. Instrumentation Research Lab.
THE USE OF A LOGARITHMIC AMPLIFIER IN DATA PROCESSING OF ANALOG SIGNALS.
by W. E. Reynolds. 1 Apr 65, 27p NASA-CR-62945, IRL-1017
Grant NSG-81-60

Descriptors: *Amplifier, *Data transmission, *Signal processing, Analog, Data, Error, Linear, Logarithm, Low level, Noise, Processing, Recording, Resolution, Signal, Transmission.

For abstract, see S 04 16.

N66-29360 **Field 6B**
CFSTI Prices HC$2.00 MF$0.50
Melpar, Inc., Falls Church, Va.
RESEARCH AND DEVELOPMENT OF AN INSTRUMENT FOR DETECTION OF EXTRATERRESTRIAL LIFE BY OPTICAL ROTATORY DISPERSION FOURTH QUARTERLY REPORT, 25 NOV. 1964 - 24 FEB. 1965.
by S. S. West. 1965, 46p NASA-CR-57324
Contract NASW-842

Descriptors: *Electro-optics, *Extraterrestrial environment, *Instrumentation, *Life detector, Acid, Biology, Breadboard, Design, Detector, Dispersion, Environment, Extraction, Extraterrestrial, Fabrication, Hydraulic, Life, Mechanical, Model, Nucleic, Optical, Rotation, Rotator, Sample, Soil, Testing.

For abstract, see S 04 16.

6C. BIOLOGY

AD-639 721 **Field 6C, 6A, 7E**
Not available from CFSTI.
Princeton Univ., N. J.
BIOLUMINESCENCE IN PROGRESS.
by Frank H. Johnson, and Yata Haneda. 1966, 655p
Contract Nonr-4264 (00)
Proj. NR-104-253
Proceedings of the Luminescence Conference held September 12-16, 1965, Hakone National Park, Kanagawa-ken, Japan.
Availability: Princeton University Press, Princeton, N. J. $15.00.

Descriptors: (*Luminescence, Biology), (*Chemiluminescence, Biology), Symposia, Biochemistry, Photochemistry, Enzymes, Indoles, Insects, Bacteria, Fungi, Protozoa, Aquatic animals, Worms, Crustacea, Fishes, Tissues (Biology), Japan.

Identifiers: Bioluminescence.

The book contains 35 technical papers given at a 'Luminescence Conference' held in Japan, Sept. 12-14, 1965, under the U.S.-Japan Cooperative Science Program. The subject of bioluminescence is treated comprehensively and in detail, from the purely chemical to the purely biological point of view by the various authors. Illustrations number more than 250 including line drawings, half-tones and color plates. Indexes are to Authors cited, Taxonomic Names, and Subjects. (Author)

AD-639 739 **Field 6C**
CFSTI Prices: HC$2.00 MF$0.50
Rochester Univ., N. Y. Dept. of Anatomy.
A STEREOTAXIC ATLAS OF THE BRAIN OF THE 13-LINE GROUND SQUIRREL (CITELLUS TRIDECEMLINEATUS).
Rept. for Sep 63-Jan 66,
by Shirley A. Joseph, Karl A. Knigge, Lea M. Kalejs, R. A. Hoffman, and Philip Reid. Oct 66, 35p
Contract DA-18-108-ANC-138 (Z)
EA-SP-100-12

Descriptors: (*Rodents, Brain), (*Brain, Anatomy), (*Hibernation, *Central nervous system), Endocrine glands.

Citellus tridecemlineatus, or 13-line ground squirrel, is a seasonal hibernator and has been used extensively to investigate this phenomenon. Current awareness of the prominent role played by the brain in regulation of endocrine function further focuses attention upon the central nervous system as the potential coordinator of the phenomena associated with the hibernating process. This atlas of the brain of the 13-line ground squirrel was prepared in support of the premise that research in the field of hibernation may benefit by stereotaxic approach to deep brain structures. (Author)

AD-639 781 **Field 6C, 6S, 22A**
CFSTI Prices: HC$5.00 MF$1.00
Aerospace Technology Div., Library of Congress, Washington, D. C.
SOVIET BIOTECHNOLOGY AND BIOASTRONAUTICS, JUNE 1965-DECEMBER 1965: COMPILATION OF ABSTRACTS.
Rept. no. 3 on ATD work assignment no. 22,
by Christopher H. Dodge. 15 Jun 66, 169p ATD-66-75
TT-66-62371
Report based on Soviet (and some Soviet-bloc) open literature for the period Jun 30-Dec 31 1965. Rept. on Surveys of Foreign Scientific and Technical Literature. See also AD-634 113.

Descriptors: (*Space biology, Abstracts), (*Space medicine, Abstracts), (*Astronautics, Abstracts), Acceleration tolerance, Vibration, Ultrasonic radiation, Radiation effects, Hypoxia, Life support, Pressure suits, Astronauts, Training, Human engineering, Telemeter systems, Electrophysiology, Space environmental conditions, Monitors, Man-machine systems, USSR.

The compilation of abstracts is based on Soviet-Satellite-Western open sources published in 1965. The third in a series, this report reflects Soviet research in the fields of bioastronautics, space biology, and space-oriented biotechnology published during the last three quarters of 1965. There are 93 entries in the form of indicative abstracts, expanded abstracts, and analytical reviews designed to present as much quantitative data as is permissible within the limitation of the abstracting format. These entries have been arranged in nine parts according to subject area: Part I. Biomedical effects of altered gravity (10 entries); Part II. Biological effects of vibration and ultrasound (5 entries); Part III. Radiation effects, dosimetry, and technology (23 entries); Part IV. Biological effects of radio frequency and magnetic fields (10 entries); Part V. Effects of altered gas environments (10 entries); Part VI. Effects of combined spaceflight factors (12 entries); Part VII. Life support systems (7 entries); Part VIII. Cosmonaut training, human engineering, and man-machine factors (7 entries); Part IX. Biomedical monitoring, biotelemetry, and biotechnology (9 entries).

AD-639 784 **Field 6C**
Not available from CFSTI.
Naval Medical Research Unit No. 2, Taipei (Taiwan).
NEW PENTASTOMIDA, SAMBONIA PARAPODUM N. SP. FROM VARANUS SALVATOR, AND ARMILLIFER AGKISTRODONTIS N. SP. FROM AGKISTRODON ACUTUS.
Technical rept.,
by J. Teague Self, and Robert E. Kuntz. 1966, 8p
NAMRU-2-TR-243
Availability: Published in Trans. Amer. Micros. Soc. v85 n2 p256-60 1966.

Descriptors: (*Parasites, Morphology (Biology)), Worms, Reptiles, Arthropods, Taiwan.

Identifiers: Pentastomida, Armillifer, Sambonia.

Sambonia parapodum n. sp. is described from Varanus salvator as the fourth member of the genus after Megadrepanoides, Self and Kuntz, 1957, with its two species, is relegated to synonymy with sambonia based on Fain's (1961) redescription of the latter. Armillifer agkistrodontis n. sp. is described from Agkistrodon acutus. (Author)

AD-639 785 **Field 6C, 6E**
Not available from CFSTI.
Naval Medical Research Unit No. 2, Taipei (Taiwan).
INTESTINAL PARASITES OF PEOPLE OF TAIWAN. INTESTINAL PARASITES OF ABORIGINES (YAMI) OF LAN YU (ORCHID ISLAND).
Technical rept.,
by Robert E. Kuntz, and Deaner K. Lawless. 28 Jun 66, 12p NAMRU-2-TR-242
Availability: Published in Journal of Formosan Medical Association v65 n6 p287-93 Jun 28 1966.

Descriptors: (*Parasites, Humans), (*Parasitic diseases, Taiwan), Intestines, Worms, Escherichia coli, Balantidium, Ascaris, Amoeba, Nematodes, Platyhelminths, Epidemiology.

Identifiers: Entamoeba, Dientamoeba fragilis, Enterobius, Trichuris, Strongyloides, Diphyllobothrium, Taenia.

A survey is presented of intestinal protozoans and helminths, based upon a study of a single fecal sample from each of 325 aborigines (Yami) on Lan Yu. Nine species of protozoa and the eggs of 10 species of helminths are recorded. The list of protozoans, including Dientamoeba fragilis and Entamoeba hartmanii, is longer than presented for other surveys in this general geographic area. Balantidium appeared in all age groups reflecting the sanitary conditions under which these people

live. Ascaris was common in all age groups of persons examined but Trichuris occurred in fewer persons than expected. Several aborigines were infected with Enterobius and Strongyloides, and rates of infection for hookworm were commensurate with existing epidemiological conditions. Diphyllobothrium and Taenia were recorded, the presence of the former suggesting possible consumption of amphibians and/or reptiles and the latter probably is present as a result of consumption of raw or partially cooked pork. (Author)

AD-639 786 **Field 6C**
Not available from CFSTI.
Naval Medical Research Inst., Bethesda, Md.
SKIN PENETRATION MECHANISMS OF HELMINTHS,
by Margaret A. Stirwalt. Aug 66, 22p
NAVMED-MF-022.03.07-1001-17
Availability: Published in Biology of Parasites p41-59 1966.

Descriptors: (*Schistosoma, Penetration), Worms, Morphology (Biology), Skin, Infections, Enzymes, Larvae, Parasites, Blood vessels, Histology, Life cycle.

The structure and physiology of human skin are described and related to the following penetration mechanisms of the Schistosoma mansoni cercaria: Brief exploration of the sebum-covered skin surface for entry sites. Attempted entry at irregularities associated with hairs, bulbous outer ends of pilosebaceous follicles, loosened keratin scales, wrinkles, sulci, furrows, ridges and folds; secretion of alkaline mucus from the acetabular glands providing for tight adhesion of the two muscular suckers to the waxy surface sebum and also for dissolving the horny keratin layer which covers the viable epidermal cellular layers. Muscular activity during the piercing of the horny layer consisting of alternate total body elongation andcontraction as it insinuates itself into the gradually-enlarged entry opening. Muscular action of oral sucker resulting in forceful striking of simultaneously protruded cuticular tips of the ends of the ducts of acetabular glands. Secretion of the preacetabular gland contents presumably containing migration enzymes which modify the ground substance of the skin in a wide area changing its normal gel consistency to a more easily negotiated liquid consistency. Schistosomules then follow the path of least resistance which is usually along tissue cleavage lines such as the keratogenous zone of the epidermis, the dermo-epidermal junction along the epidermal side of the basement membrane, inward along this tissue junction of the pilosebaceous glands, into sebaceous glands and from them into the dermis, thus avoiding a basement membrane, and then along tissue cleavage lines in the dermis into lymphatics or small venous vessels. (Author)

AD-639 796 **Field 6C**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
SCATTERING OF LIGHT BY SOLUTIONS OF NATIVE, DENATURED AND DEGRADED DEOXYRIBONUCLEIC ACID,
by V. E. Eskin, and O. Z. Korotkina. Jul 65, 16p
Trans-1482
TT-66-62374
Trans. of Biofizika (USSR), v10 n1 p26-31 1965.

Descriptors: (*Desoxyribonucleic acids, Light transmission), Biophysics, Degradation, Molecular weight, Ultrasonic radiation, Mechanical properties, Refraction, Scattering, USSR.

Identifiers: Macromolecular biology.

AD-639 797 **Field 6C**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
THE USE OF ACRIDINE ORANGE LUMINESCENCE FOR THE STUDY OF THE SECONDARY STRUCTURE OF NUCLEIC ACIDS,
by O. F. Borisova, and L. A. Tumerman. Jul 65, 15p Trans-1483
TT-65-63435
Trans. of Biofizika (USSR), v10 n1 p32-6 1965.

Descriptors: (*Nucleic acids, *Biological stains), (*Acridines, Biological stains), Luminescence, Fluorescence, Desoxyribonucleic acids, Morphology (Biology), Dyes, USSR.

AD-640 036 **Field 6C, 6M**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
THE LEVEL OF IRON IN THE BLOOD AND LIVER OF RODENTS WITH DIVERSE INFECTIOUS SENSITIVITY TO PLAGUE,
by L. A. Avanyan, N. S. Glazko, and T. M. Sosnikhina. Jun 65, 12p Translation-1610
TT-66-62392
Trans. of Armyanskaya Protivochumnaya Stantsiya, Erevan. Trudy (USSR) n3 p121-33 1964.

Descriptors: (*Pasteurella, Diseases), (*Rodents, Pasteurella), (*Blood chemistry, Rodents), Ecology, Iron, Liver, Blood, Sensitivity, USSR.

CONCLUSIONS: In rodents which are comparatively mildly sensitive to plague the ability to deposit iron in the liver is greater than the rodents which are highly sensitive. At the same time, the index of the relationship of iron in the blood to iron in the liver in highly sensitive rodents is greater than in midly sensitive rodents.

AD-640 047 **Field 6C, 2D**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
THE PHOTOPERIOD IN SEVERAL VIETNAM VARIETIES OF RICE,
by Bui Gui Dap, and Ngiem Fu Shuan. Jun 65, 19p Translation-1601
TT-66-62406
Trans. of Agrobiologiya (USSR) n2 (116) p220-30 1959.

Descriptors: (*Cereals, Photoperiodism), (*Agriculture, Vietnam), Growth, Temperature, Periodic variations, USSR.

The study of the light phase in three typical varieties of rice in North Vietnam by the method of the reaction to short and uninterrupted days showed the following: The Nam Ninh variety, as the majority of varieties of spring rice with a short cycle of development, apparently is mildly sensitive to light conditions. It can bloom under the conditions of both the short and the uninterrupted day. The tenth and fifth month varieties--Tam Den and Chiem Chanh, with longer cycles of development, must have a short day for normal development. For the Tam Den variety, developing in the spring and summer under the conditions of a high temperature, the light phase begins very early--between the 20th and 23rd day following sowing, while for the Chiem Chanh variety, the development of which takes place first at a low winter temperature and then at a higher temperature in the spring and the beginning of summer, this phase begins much later -- only between the 90th and the 100th day following sowing. The temperature has a very important significance for the passing through of the light phase by rice. In the winter months with a temperature of less than 20 degrees of heat, the Chiem Chanh variety does not enter this stage, in spite of the short day. For this it requires the higher temperatures of the spring months. The investigations shows that if under the conditions of North Vietnam rice is to be cultivated in the same area several times a year, then it is better to use varieties with shorter cycles of development, of the spring type, since they are more plastic, and become better adapted to various conditions of illumination. (Author)

AD-640 051 **Field 6C**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
ROOT APHID ON SUGAR BEETS,
by N. I. Pavlyuk. 1965, 5p Trans-1072
TT-66-62410
Trans. of Zashchita Rastenii ot Vreditelei i Bolezni (USSR), v8 n6 p18-9 1963.

Descriptors: (*Plants (Botany), Diseases), Vegetables, Hemiptera, Larvae, Insect control, Storage, Periodic variations, USSR.

Identifiers: Sugar beets, Aphids.

AD-640 341 **Field 6C**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
RELATIONSHIP BETWEEN ETHYLENE EVOLUTION AND LEAF ABSCISSION,
by Bernard Rubinstein, and F. B. Abeles. 1965, 6p
Availability: Published in Botanical Gazette v126 n4 p255-9 Dec 1965.

Descriptors: (*Plants (Botany), *Ethylenes), Tissues (Biology), Stimulation, Amino acids, Defoliants.

Identifiers: Abscission.

The abscission of petiole explants of Phaseolus vulgaris can be correlated with the presence of endogenously produced ethylene. In all cases active promoters of abscission induced the evolution of ethylene prior to observable tissue separation. Substances that had little effect on abscission rates resulted in the production of negligible quantities of ethylene. Stimulatory action on abscission can be reduced by ventilation of the explants. It is concluded that endogenous ethylene participates in the abscission processes in bean-petiole abscission zones. (Author)

AD-640 346 **Field 6C**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
MICROBIOLOGICAL CONTAMINATION CONTROL,
by Robert W. Edwards, Martin S. Favero, Robert K. Hoffman, Tom B. Lanahan, and Norman H. MacLeod. 1966, 7p
Availability: Published in unidentified journal.

State-of-the-art reviews), Control, Standards, Test methods, Clean rooms, Sanitary engineering, Germicides, Decontamination, Professional personnel.

The general principles of microbiological contamination control and the requirements for measurement and testing discussed in the report illustrate the need for the involvement of a trained microbiologist in every control endeavor. They also illustrate the need for additional summarized information on the standards of control, the techniques required to achieve control, and means of microbiologically determining when control is reached.

AD-640 350 **Field 6C**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
AUXIN STIMULATION OF ETHYLENE EVOLUTION,
by F. B. Abeles. 13 Sep 65, 3p
Availability: Published in Plant Physiology v41 n4 p585-8 Apr 1966.

Descriptors: (*Plants (Botany), *Ethylenes), (*Growth substances, Plants (Botany)), Tissues (Biology), Stimulation, Antibiotics, Enzymes, Biosynthesis, Antimetabolites.

Identifiers: Abscission, Auxins.

The stimulation of ethylene production from seedling tissue of Phaseolus vulgaris, Helianthus annuus and Zea mays by growth regulators was inhibited by actinomycin D and puromycin and to a lesser extent by 2-thiouracil and p-fluorophenylalanine. It is concluded that the mechanism of

action of growth regulators on the enhancement of ethylene production is the formation of enzymes involved in ethylene biogenesis. (Author)

N66-28165 **Field 6C**
CFSTI Prices HC$2.00 MF$0.50
Istituto Superiore Di Sanita, Rome (Italy). Laboratori Di Fisica.
ATTEMPTS AT BIOPHYSICAL SCHEMATIZATION.
Tentativi Di Schematizzazione Biofisica
by M. Ageno. 10 Mar 66, 31p ISS-66/10
In Italian, English Summary

Descriptors: *Biophysics, *Cell division, *Electron microscopy, *Molecular structure, *Resonance charge exchange, Acid, Amino, Cell, Charge, Division, Electron, Exchange, Interaction, Microscope, Microscopy, Molecular, Organism, Reproduction, Resonance, Structure, Transport.

For abstract, see S 04 15.

N66-28784 **Field 6C**
CFSTI Prices HC$2.00 MF$0.50
Aerospace Medical Div. Aerospace Medical Research Labs. (6570th), Wright-patterson Afb, Ohio.
EFFECTS OF ORAL ADMINISTRATION OF A FUEL CELL PRODUCT WATER TO MACACA MULATTA FINAL REPORT, JAN. - FEB. 1965.
by R. F. Ziegler. Mar 66, 28p NASA-CR-75787, AMRL-TR-65-176
NASA ORDER T-31248-G
Joint Nasa/usaf Study

Descriptors: *Fuel cell, *Monkey, *Water intake, Animal, Balance, Cell, Fluid, Fuel, Intake, Oral, Product, Space, Study, Toxicity, Vehicle, Water.

For abstract, see S 04 16.

N66-28800 **Field 6C**
CFSTI Prices HC$4.00 MF$1.00
National Biomedical Research Foundation, Silver Spring, Md.
INVESTIGATION OF THERMODYNAMIC MECHANISMS FOR THE PRODUCTION OF COMPLEX COMPOUNDS ESSENTIAL FOR THE ORIGIN OF LIFE FINAL REPORT, 1 OCT. 1965 - 30 SEP. 1966.
by M. O. Dayhoff, R. V. Eck, and E. R. Lippincott. 1966, 127p NASA-CR-74559
Contract NSR-21-003-002

Descriptors: *Amino acid, *Atmospheric composition, *Biochemistry, *Organic compound, *Planetary atmosphere, *Protein, *Thermodynamic equilibrium, Acid, Amino, Atmospheric, Carbon, Chondrite, Composition, Compound, Computer, Constituency, Earth, Enzyme, Equilibrium, Evolution, Hydrogen, Jupiter (planet), Mars, Organic, Oxygen, Planetary, Program, Thermodynamic, Venus.

For abstract, see S 04 16.

N66-29361 **Field 6C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
COMPARISON OF RADIOSENSITIVITY IN VARIOUS STRAINS OF DROSOPHILA MELANOGASTER.
Sravnitel'noye Izucheniye Radiochuvstvitel'nosti Razlichnykh Liniy Drosophila Melanogaster
by I. YE. Vorobtsova. Apr 64, 9p NASA-TT-F-8840
Transl. Into English From Dokl. Akad. Nauk Sssr (Moscow), V. 153, No. 4, 1963 P 943-946

Descriptors: *Animal study, *Drosophila, *Radiation effect, *Radiosensitivity, Animal, Average, Comparison, Distortion, Duration, Effect, Exposure, Life, Male, Radiation, Resistance, Strain, Study, Survival, Time, Zoology.

For abstract, see S 04 16.

N66-29443 **Field 6C**
CFSTI Prices HC$4.00 MF$1.00
United Aircraft Corp., Windsor Locks, Conn. Space And Life Systems Dept.
STATISTICAL DECISION PROBLEMS IN LARGE SCALE BIOLOGICAL EXPERIMENTS FINAL REPORT.
by D. R. Hitchcock, and G. B. Thomas. 31 Mar 65, 148p NASA-CR-57677, SLS-5305R
Contract NASW-871

Descriptors: *Biology, *Mars (planet), *Statistical decision theory, Bandwidth, Computer, Control, Cost, Decision, Detection, Error, Experiment, Exploration, Extraterrestrial, Life, Manned, Program, Reliability, Requirement, Simulation, Spacecraft, Statistical, Theory.

For abstract, see S 04 16.

AD-639 761 **See Field 6E**

AD-639 836 **See Field 6R**

AD-640 034 **See Field 6E**

AD-640 163 **See Field 6S**

AD-640 327 **See Field 22A**

AD-640 349 **See Field 6E**

AD-640 352 **See Field 6M**

PB-170 918 **See Field 6R**

6D. BIONICS

AD-443 107 **Field 6D, 9B**
CFSTI Price: HC$4.00
Stanford Electronics Labs., Stanford Univ., Calif.
ADAPTIVE PATTERN DICHOTOMIZATION,
by James S. Koford. Apr 64, 114p SU-SEL-64-048, Technical rept., TR-6201-1
Contract DA-04 (200)-AMC-57 (Z)

Descriptors: (*Adaptive control systems, Pattern recognition), Automatic, Computer logic, Optimization, Circuits, Errors, Networks, Linear systems, Mathematical models, Decision making, Inequalities, Analog systems, Probability.

Identifiers: Adaline.

The purpose of this research is to make an investigation of the principles governing the ability of an adaptive linear threshold element to 'dichotomize' - i.e., to classify into two categories-patterns consisting of combinations of analog or binary variables. Automatic pattern classification is becoming increasingly important in such fields as object identification from radar or sonar returns; speech recognition and translation; and weather prediction from meteorological data. The research described combines both aspects of earlier work into a unified approach to the adaption of the linear threshold element. (Author)

AD-461 244 **Field 6D, 9B**
CFSTI Price: HC$2.60
Stanford Electronics Labs., Stanford Univ., Calif.
A CRITICAL COMPARISON OF TWO KINDS OF ADAPTIVE CLASSIFICATION NETWORKS,
by B. Widrow, and K. Steinbuch. Dec 64, 24p Technical rept., TR-6764-2, SU-SEL-64-126
Contract DA-04 (200)-AMC-57 (Z)

Descriptors: (*Adaptive control systems, Networks), West Germany, Teaching machines, Pattern recognition, Computer logic, Digital computers, Programming (Computers), Statistical analysis, Bibliographies, Switching circuits, Optimization, Data storage systems, Learning machines.

Identifiers: Learning matrix network, madaline network.

The report compares the capabilities and equipment requirements of two kinds of adaptive classification networks - the 'learning matrix,' and the madaline. The learning matrix and the madaline are structurally quite similar, forming arrays of binary output signals from linear combinations of binary or analog input signals. Both systems can learn (adjust their own parameters) from sets of patterns (with corresponding desired outputs) presented to them, and they can thereafter successfully classify additional patterns as presented. The two systems differ primarily in their training methods and in their output logic. Both the learning matrix and the madaline can be realized either by the use of adaptive hardware or by digital-computer simulation. The comparison indicates that in most cases the learning matrix will require fewer adaptation cycles than will the madaline when applied to a given problem; on the other hand, the madaline will usually require less equipment than the learning matrix. However, in making a choice of techniques for a given situation, the overriding consideration will usually be the question of optimality. (Author)

AD-640 004 **Field 6D**
CFSTI Prices: HC$3.00 MF$0.50
Fein (Louis), Palo Alto, Calif.
ADAPTIVE SYSTEMS.
Final rept. 1 Nov 64-31 Oct 65,
by Louis Fein. Aug 66, 55p
Contract Nonr-4771 (00)
Proj. NR-277-017

Descriptors: (*Adaptive systems, Design), Pattern recognition, Artificial intelligence, Scientific research, Bionics.

Identifiers: Self-organizing systems.

It removes the ambiguity of the phrase 'adaptive machine,' if one puts an adaptive machine into one of three categories according to whether or not the machine itself must be changed as it is being designed on the one hand, and as it is being operated, on the other. Adaptive machines are either unadaptively-designed and adaptively-operated, or adaptively-designed and unadaptively-operated, or adaptively-designed and adaptively-operated. A procedure is developed for identifying the possible causes of failure of adaptive machines (belonging to any of the three categories) to answer questions of interest to the Navy and to the scientific community--questions of target recognition, flight control, language translation, weather prediction, or robot construction. For each possible cause of failure, there is, of course, a research project which, if successful, would serve to eliminate that cause and would bring the Navy a step closer to the realization of practical, adaptive machines. It turns out that there are only five classes of causes of failure and five corresponding classes of research projects. These five classes are: question formulation; question reformulation; method feasibility; machine realizability and designability; machine practicality. This procedure provides a straightforward way of planning directed research programs to successful adaptive systems. A research program is recommended. (Author)

AD-640 268 **Field 6D, 9B**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
A DIGITAL-COMPUTER MODEL OF SPIKE ELICITATION BY POSTSYNAPTIC POTENTIALS IN SINGLE NERVE CELLS,
by R. J. MacGregor. Sep 66, 42p RM-4877-ARPA
Contract SD-79, ARPA Order-189-1

Descriptors: (*Bionics, Nerve cells), (*Nerve cells, Models (Simulations)), Nerve impulses.

Physiology, Nervous system, Electrophysiology, Mathematical models, Digital computers, Biophysics.

A simulation of the information-processing function of nerve cells is presented. The computer model simulates the portion of the neuron at which spike potentials are initiated. Values for parameters were specified on the basis of neuroelectric recordings so that the results obtained might be pertinent to actual nerve cells. Trial runs verify that the model is accurately reproducing the functional forms of neuroelectric data. Input-output relations under regular input are given for a wide range of input frequency and pulse amplitude. (Author)

AD-640 505 **Field 6D**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
CYBERNETICS,
by M. Lebedeva, and A. Smirnov. 5 Oct 66, 9p
LT-66-52
TT-66-62465
Trans. of mono. of Kultura, Nauka, Iskusstvo SSSR, Moscow, p97-101 1965.

Descriptors: (*Cybernetics, Scientific research), USSR, Man-machine systems, Data processing systems, Bionics.

N66-28271 **Field 6D, 5J, 9B**
CFSTI Prices HC$4.00 MF$0.75
System Research, Ltd., Richmond (England).
RESEARCH ON CYBERNETIC INVESTIGATION OF LEARNING AND PERCEPTION ANNUAL SUMMARY REPORT NO. 3.
by M. Elstob, G. L. Mallen, and G. Pask. 15 Feb 66, 104p AFOSR-66-0644, AD-631634
Contract AF 61/052/-640

Descriptors: *Cybernetics, *Learning system, *Mathematical model, *Perception, Artificial, Automaton, Control, Intelligence, Learning, Machine, Mathematics, Memory, Model, Simulation.

For abstract, see S 04 15.

N66-36089 **Field 6D**
CFSTI Prices HC$5.00 MF$1.00
General Mills, Inc., Minneapolis, Minn. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena. Atmospheric And Aerosol Physics Research.
MICROSCOPIC SYSTEM FOR MARS STUDY PROGRAM (FEASIBILITY STUDY) FINAL REPORT, 30 OCT. 1961 - 31 MAR. 1962.
by R. Ginsberg, V. W. Greene, D. Lundgren, R. E. Peterson, and D. Rotenberg. 30 Apr 62, 168p
NASA-CR-50429
Contracts NAS7-100, JPL-950123
Prepared For Jpl Its Rept.-2274

Descriptors: *Life detector, *Microscope, Automatic, Collection, Design, Detection, Instrument, Life, Microorganism, Observation, Optical, Processing, Remote, Sample, System.

For abstract, see S 04 21.

AD-639 706 **See Field 9C**

AD-639 837 **See Field 9B**

AD-640 188 **See Field 9B**

6E. CLINICAL MEDICINE

AD-479 452 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Chemical Research and Development Labs., Edgewood Arsenal, Md.
PATHOLOGIC FINDINGS IN THE LABORATORY GOAT. PART III. TRAUMATIC BONE LESIONS,
by Clarence E. Hopkins Sr, and F. W. Light Jr.
Dec 65, 23p CRDL-Special Pub-2-67
Proj. 1M012501A027

Descriptors: (*Bone, Pathology), (*Fractures (Bone), Classification), Goats, Wounds + injuries, Diagnosis, Anatomy, Shock (Pathology).

The report, which is a supplement to CRDLSP 2-62, (AD-473 164 and AD-473 165), contains data pertaining to traumatic bone lesions found in autopsies on 2,000 goats used in wound ballistics studies. Outlined are the methods used in examining and describing bone specimens and those used in collating the findings. A detailed table records frequency of injury to individual bones. The technical aspects applicable to the preparation of osteological specimens are discussed. (Author)

AD-639 638 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Northwestern Univ., Evanston, Ill. Auditory Research Lab.
AN EXPANDED TEST FOR SPEECH DISCRIMINATION UTILIZING CNC MONOSYLLABIC WORDS: NORTHWESTERN UNIVERSITY AUDITORY TEST NO. 6.
Rept. for 16 Jan 64-15 Apr 65,
by Tom W. Tillman, and Raymond Carhart. Jun 66, 16p
Contract AF 41 (609)-2643
Task 775508
SAM-TR-66-55

Descriptors: (*Audiometry, Test methods), Speech recognition, Phonetics, Vocabulary, Otorhinolaryngology, Hearing, Pathology, Reliability, Auditory acuity.

Northwestern University Auditory Test No. 6 is composed of four lists of 50 consonant-nucleus-consonant (CNC) monosyllabic words each. The construction of the test followed the same scheme employed earlier in the development of N. U. Test No. 4, a less extensive version using the same type of material. The four lists of N.U. Test No. 6 were given twice to each of two subject groups--one group with normal hearing and another with sensorineural hypoacousis. During each administration, six ascending presentation levels were used ranging from -4-dB to 40-dB sensation level. The two groups yielded articulation functions highly similar to those obtained with the earlier test (N.U. Test No. 4). The new test (N.U. Test No. 6) appears to have good interlist equivalence and high test-retest reliability. It thus retains the desirable features of the earlier tool while doubling the inventory of items available for the measurement of phonemic discrimination. (Author)

AD-639 639 **Field 6E**
CFSTI Prices: HC$2.00 MF$0.50
Northwestern Univ., Evanston, Ill. Auditory Research Lab.
MONAURAL VERSUS BINAURAL DISCRIMINATION FOR FILTERED CNC MATERIALS: THE IMPAIRED AUDITORY MECHANISM.
Rept. for 1 May 63-15 Dec 64,
by Tom W. Tillman, Paul C. Bucy, and Raymond Carhart. Jul 66, 26p
Contract AF 41 (609)-2643
Task 775508
SAM-TR-66-64

Descriptors: (*Audiometry, Test methods), Speech recognition, Otorhinolaryngology, Hearing, Pathology, Central nervous system, Auditory signals, Auditory acuity.

Northwestern University Auditory Test No. 4 was altered by: (1) low-pass filtering with a 1480 cps cutoff frequency and a 54 dB per octave slope; and (2) high-pass filtering utilizing an 1830 cps cutoff frequency and a 36 dB per octave slope. By using these filtered materials, a single binaural and two monaural articulation functions were derived for each of 60 subjects with peripheral hearing losses and 7 subjects with unilateral CNS lesions judged to involve the auditory system. In the monaural conditions each subject received either the high-pass or low-pass filtered signal. In the binaural condition the two messages were presented simultaneously, one to each ear. The experimental hypothesis predicted that for the subjects with peripheral impairments, the slope of the binaural function would exceed that of the steeper monaural one. Conversely, it predicted that for the subjects with unilateral central involvement, the binaural function would not differ in slope from the monaural functions. Results only partially confirmed this hypothesis. For both groups, the slope of the binaura'l function exceeded that of the steeper monaural function; however, the slope of the binaural function for the peripheral lesion group exceeded that of the CNS lesion group. Since the hearing acuity of the latter group was within normal limits, this finding indicates that in unilateral central auditory lesions, the binaural processing of speech signals is incomplete. (Author)

AD-639 678 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
THE PERIODONTAL STATUS OF INCOMING AIR FORCE ACADEMY CADETS.
Rept. for 1 Jun-1 Aug 65,
by Lee M. Lightner, Timothy J. O'Leary, Robert B. Drake, Phelps P. Crump, and Glenn J. Jividen. Aug 66, 15p SAM-TR-66-66
Proj. AF-7753
Task 775303

Descriptors: (*Dentistry, *Air force personnel), Teeth, Diseases, Mouth.

The study was carried out as the first phase of a long-term study to determine the relative effectiveness of various preventive measures. Three examiners evaluated and scored 713 incoming cadets at the United States Air Force Academy for gingival status, periodontal status, and the presence and extent of plaque and hard deposits. Gingival mean scores for the six segments ranged from 1.72 for the maxillary anterior area to 1.95 for the mandibular anterior area. The mandibular anterior segment also had the highest mean score for periodontal status and for hard deposits of any of the six segments scored. The highest plaque mean scores were recorded for the maxillary posterior segments. This study points out the presence of objective, documentable signs of periodontal disease in a highly selected group of young males. (Author)

AD-639 712 **Field 6E**
CFSTI Prices: HC$2.00 MF$0.50
Honeywell, Inc., Minneapolis, Minn. Systems and Research Div.
INFORMATION ANALYSIS OF THE ELECTROENCEPHALOGRAM.
Final scientific rept. 1 Sep 65-31 Aug 66,
by Donald I. Tepas. Sep 66, 31p Rept. no. 12021-FR1
Contract AF 49 (638)-1606
Proj. AF-9777
Task 977701
AFOSR-66-1941

Descriptors: (*Electroencephalography, Analysis), Sensory perception, Auditory signals, Visual signals, Heart, Motor reactions, Stimulation, Experimental data, Electrophysiology, Humans.

Average potentials synchronized with cardiac cycle, motor activity, auditory stimulation, and visual stimulation were reliably detected and isolated in the electroencephalographic activity from one pair of scalp leads. The results indicate that the averaging technique need not be limited to the detection of potentials directly evoked by sensory stimulation. The data also demonstrate that it is possible to detect and measure several average potentials in a single human electroencephalographic recording. In addition, the data show that time-locked average potentials simultaneously present in a given electroencephalographic recording can summate in an algebraic manner. This suggests

that a major portion of conventional electroencephalographic recordings may consist of the algebraic sum of a number of concomitant specific potential changes. The averaging technique is suggested as a general method whereby component parts of electroencephalographic activity can be separated for systematic experimental analysis. (Author)

AD-639 753 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Universidad Nacional Mayor de San Marcos de Lima (Peru). Instituto de Patologia.
PATHOLOGY AT HIGH ALTITUDE.
Annual rept. no. 1, May 65-Apr 66,
by Alberto Cuba-Caparo, Juan Takano, Leoncio Vega, and Ramon Puron. Apr 66, 15p
Grant DA-ARO-49-092-65-G91
Proj. DA-2N014501B71D-00-027-LA

Descriptors: (*High altitude, *Pathology), Diseases, Humans, Biopsy, Histology, Surgery, Diagnosis, Hospitals, Statistical data, Peru.

The study of 41 autopsies and 276 surgical and biopsy specimens from high altitude, 12,000 feet above sea level, are presented. The autopsy results are given in three tables, showing the distribution by age, race and sex of the patients; the fundamental diagnosis in four groups (prematures, new born, children and adults); and the anatomo pathological diagnosis. The pathological diagnosis of two hundred seventy six surgical and biopsy specimens are shown. They are classified as: (a) Tumors, (b) Inflammation, (c) Parasitic diseases and (d) Miscellaneous. These specimens, collected in eight and a half months of work in Chulec Hospital and Hospital Obrero de la Oroya, are insufficient to draw conclusions about the incidence of the different observed diseases.

AD-639 759 **Field 6E**
Not available from CFSTI.
Army Medical Research and Nutrition Lab., Denver, Colo.
CHRONIC CHLORPROMAZINE CHOLANGIOLITIC HEPATITIS,
by Robert A. Levine, Gordon W. Briggs, and David M. Lowell. 9 Sep 65, 6p
Availability: Published in Gastroenterology v50 n5 p665-70 May 1966.

Descriptors: (*Hepatitis (Nonviral), *Chlorpromazine), Liver, Biopsy, Histology, Immune serums, Fluorescent antibody techniques, Gamma globulin.

A case of chlorpromazine-induced chronic pericholangiolitic hepatitis, simulating the clinical syndrome of xanthomatous biliary cirrhosis, was observed over a 16-month period. Hepatic biopsy tissue tested by immunofluorescence for bound globulin and studies of the patient's serum for tissue-specific circulating binding substances were negative. Although some cases of primary biliary cirrhosis may be causally related to chlorpromazine, this study suggests that dissimilar mechanisms are probably involved in the pathogenesis of these two diseases. (Author)

AD-639 761 **Field 6E, 5B, 6C, 2E K**
Not available from CFSTI.
Army Medical Research and Nutrition Lab., Denver, Colo.
USE OF THE ELECTRONIC COMPUTER IN RETRIEVAL OF VETERINARY PATHOLOGIC DATA,
by M. W. Castleberry, Edward D. Jenkins, and S. W. Thompson II. 1 Dec 64, 6p
Availability: Published in The American Journal of Veterinary Research v27 n118 p824-9 May 1966.

Descriptors: (*Pathology, *Information retrieval), (*Veterinary medicine, Information retrieval), Computers, Laboratory animals, Programming (Computers).

The use of an electronic computer in an experimental pathology laboratory to retrieve data on accessions was studied. Separate lists or codes were made for anatomical sites, pathologic changes, and case identifying data. Individual entries were numerically designated with the exception of the sensing symbol and sex, which were alphabetically identified. A 21-digit format was developed to program computer input and interrogation. Four hundred case records (accessions) were coded; the information was stored in a computer data record, and the machine subsequently was interrogated with questions having known answers. Answers, in the form of case accession numbers, were quickly and accurately obtained. It is believed this data retrieval system has applicability to large, lifescience research centers or groups having access to an electronic computer. (Author)

AD-639 767 **Field 6E**
Not available from CFSTI.
Army Medical Research and Nutrition Lab., Denver, Colo. Pathology Div.
A TECHNIC FOR PREPARATION OF SPECIMENS OF WHOLE-MOUNTED HELMINTHS FOR MICROSCOPIC STUDY,
by Clemith J. Houston. 12 Aug 65, 2p
Availability: Published in The American Journal of Clinical Pathology v45 n4 1966.

Descriptors: (*Worms, *Histological techniques), Microscopy, Preparation, Morphology (Biology), Epoxy plastics.

A technic utilizing an epoxy resin as a mountant in preparing whole-mounts of helminths for microscopic study is presented. This new mountant is permanent, extremely durable, does not crack or discolor upon aging, and is neither water- nor heat-soluble. (Author)

AD-639 792 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
IMPROVING THE ORGANIZATION OF MASS VACCINATIONS AGAINST TULAREMIA,
by V. G. Pilipenko. Jun 65, 11p Trans-1393
TT-64-19839
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR), v41 n6 p29-34 1964.

Descriptors: (*Pasteurella tularensis, *Immunity), (*Public health, USSR), Vaccines, Diseases, Epidemiology.

The main reason for small coverage of the population with inoculations against tularemia in the Stavropolskiy Kray over a period of many years was the tendency to carry out this measure simultaneously in all the enzootic rayons of the kray, regardless of the fact that based on degree of danger for the population they are not the same. With the aim of regulating this measure, the entire zone which was enzootic for tularemia was divided into rayons based on the degree of danger for the population and a planned vaccination was conducted in sequence according to the groups of rayons, beginning with the most dangerous and concluding this measure in enzootic but less dangerous rayons. The entire population in each group of rayons is covered by vaccinations during the period of one year, and after every five years a planned revaccination is conducted in the same sequence based on the groups of rayons. In the years between the regular mass inoculations, the only people subjected to immunization are those arriving from safe terrain and children who have reached their seventh year. (Author)

AD-639 793 **Field 6E, 6M**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
THE EFFECTIVENESS OF IMMUNIZATION THROUGH SCARIFIED SKIN WITH THE LIVE PLAGUE VACCINE,
by M. M. Faybich. Jul 65, 10p Trans-1472
Included in TT-65-51891. Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR), v41 n10 p125-30 1964.

Descriptors: (*Pasteurella, Immunity), (*Vaccines, Effectiveness), Skin, Injection (Medicine), Mice, Guinea pigs.

Conclusions: A single inoculation with live plague vaccine through scarified skin imparted, to white mice and guinea pigs which were susceptible to plague, an immunity to the same degree as its inoculation under the skin, causing during this a clinically more expressed reaction than the subcutaneous vaccination. Of the live vaccines, prepared from the vaccine strain EV and strains no. 148, 149, and 150, the latter proved to be most effective. The live vaccine prepared from no. 150 caused a reaction analogous to the reaction to the administration of the EV strain. (Author)

AD-639 840 **Field 6E, 7B**
CFSTI Prices: HC$1.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
EFFECT OF PYROPHOSPHATES ON THE LABORATORY PERFORMANCE OF TOPICALLY APPLIED AQUEOUS STANNOUS FLUORIDE,
by Ira L. Shannon, Thomas R. Dirksen, and Warren R. Hester. 4 Jun 62, 6p SAM-TR-62-108

Descriptors: (*Tin compounds, Fluorides), (*Fluorides, *Toilet articles), Dentistry, Teeth, Diseases, Phosphates.

Laboratory studies were carried out on 280 extracted human molars to determine the compatibility of pyrophosphates with stannous fluoride in aqueous solution. The ability of 0.4 percent stannous fluoride to function effectively in topical applications was negated by the addition of calcium pyrophosphate to the solution. (Author)

AD-639 848 **Field 6E**
Not available from CFSTI.
Michigan Univ., Ann Arbor.
A NEW 'SHELL CASTING' TECHNIC,
by E. R. Dootz, R. G. Craig, and F. A. Peyton. 1966, 4p
Contract DA-49-007-MD-938
Presented at General Meeting International Association Dental Research (43rd), Toronto, Canada, 1965, Paper No. 254.
Availability: Published in Dental Laboratory Review Jul 1966.

Descriptors: (*Teeth, Prosthetics), (*Casting, Dentistry), Processing.

A new shell investment was formulated that hardened rapidly enough so that consecutive layers could be applied to a wax pattern without requiring intermediate drying cycles between each layer. This new 'shell casting investment' is a two component system. One component is a slurry composed of a binder, water, wetting agent, and various refractory materials to control the viscosity of the slurry and the thermal expansion of the set investment. It is hoped that this new shell casting technic will stimulate the interest of technicians and gain in popularity in the coming years to the point where it becomes an accepted denture casting technic.

AD-640 033 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
TRANSPLACENTAL (PASSIVE) TRANSMISSION OF PLAGUE ANTIBODIES IN RHOMBOMYS, SEROLOGICAL INVESTIGATION IN PLAGUE,
by M. I. Levi, and Yu. G. Suchkov. Aug 64, 9p
Trans-1181
TT-66-62390
Trans. of Byulleten Eksperimentalnoi Biologii i Meditsiny (USSR), v55 n6 p8-91 1963.

Descriptors: (*Pasteurella, Antigens + antibodies), (*Embryos, *Immunity), (*Pregnan-

cy, Antigens + antibodies), Diseases, Serodiagnosis, USSR.

AD-640 034 **Field 6E, 6C**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
MIXED EPIZOOTIC OF TULAREMIA AND OMSK HEMORRHAGIC FEVER IN MUSKRATS IN WESTERN SIBERIA,
by L. S. Egorova, P. V. Korsh, O. V. Ravdonikas, and T. N. Fedorova. Jul 65, 9p Trans-1465
TT-66-62391
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR), v42 n12 p26-9 1965.

Descriptors: (*Pasteurella tularensis, Diseases), (*Infectious diseases, *Rodents), Etiology, Siberia, Omsk virus, USSR.

Identifiers: Hemorrhagic fever.

CONCLUSIONS: (1) The possibility of mixed epizootics of tularemia and Omsk hemorrhagic fever in the muskrat population was exposed. (2) Cases of simultaneous infection of muskrats with tularemia and Omsk hemorrhagic fever are possible. (3) Epizootics of both Omsk hemorrhagic fever and tularemia can be spread among the muskrats in the autumn-winter period. (4) For the first time the distribution was determined for the Omsk hemorrhagic fever virus on the territory of the lake region of the forest-steppe of Kurgan (Mokrousovskiy Rayon) and Novosibirsk (Barabinskiy, Kargatskiy and Chanovskiy Rayons) Oblasts. In connection with this, it is necessary for the medical workers of the lake region of the forest-steppe zone of these oblasts to keep Omsk hemorrhagic fever in mind during diagnosis of infectious diseases. (5) During the emergence of an epizootic among muskrats, the infection of people is possible not only with tularemia, but also with Omsk hemorrhagic fever. (Author)

AD-640 035 **Field 6E, 6M**
CFSTI Prices: HC$5.00 MF$1.00
Army Biological Labs., Frederick, Md.
JAPANESE ENCEPHALITIS,
by P. A. Petrishcheva, E. N. Levkovich, and S. T. Boldyrev. 9 Jun 64, 153p Translation-1115
TT-66-62389

Descriptors: (*Japanese B encephalitis virus, Diseases), Epidemiology, Ecology, Etiology, Diagnosis, Therapy, Disease vectors, Culicidae, Aedes, Life cycle, Birds, Growth, Vaccines, Immunity, Serodiagnosis, Pathology, Antigens + antibodies, Periodic variations, Insect control, Nervous system diseases, USSR.

CONTENTS: Epidemiology; Types of Foci of Japanese Encephalitis; Etiology; Clinical Aspects and Treatment; Prophylaxis of Japanese Encephalitis; Methods of Studying Japanese Encephalitis; Brief Supplementary Review of the Foreign Literature on the Epidemiology of Japanese Encephalitis; Bibliography.

AD-640 037 **Field 6E, 6M**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
INFLUENCE OF ANAPHYLACTIC SHOCK ON THE COURSE OF EXPERIMENTAL ANTHRAX,
by N. A. Tsaregradskaya. Jul 65, 4p Translation-1473
TT-66-62393
Trans. of Veterinariya (USSR) v33 n5 p50 1956.

Descriptors: (*Bacillus anthracis, Allergy), Vaccines, Diseases, Guinea pigs, Mortality rates, USSR.

Conclusions: Anaphylactic shock extends the living period of guinea pigs during experimental anthrax by 2-3 times in comparison with the control. During the administration of Second Tsenkovskiy Vaccine soon after the disappearance of shock symptons, the period of survival of the test animals was increased by three times. When the Second Tsenkovskiy Vaccine was administered after 2-3 days following shock, the period of survival of the test animals was increased by two times. (Author)

AD-640 038 **Field 6E, 6F**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
PROBLEMS OF EPIDEMIOLOGY AT THE 14th ALL-UNION CONFERENCE OF EPIDEMIOLOGISTS, MICROBIOLOGISTS AND INFECTIOUS DISEASE SPECIALISTS,
by V. E. Korostelev. Jul 65, 11p Trans-1468
TT-65-63067
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR), v41 n12 p3-8 1964.

Descriptors: (*Epidemiology, Symposia), (*Public health, USSR), Infectious diseases, Ecology, Immunity, Vaccines, Disease vectors, Rodenticides, Germicides.

AD-640 039 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
SEVERAL RESULTS OF USING CONCENTRATED DRY STI ANTHRAX VACCINE IN EASTERN SIBERIA,
by Yu. I. Sorkin. Jul 65, 3p Trans-1471
TT-66-62395
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR), v42 n3 p150 1965.

Descriptors: (*Bacillus anthracis, *Vaccines), (*Immunity, Bacillus anthracis), Allergy, Effectiveness, USSR.

AD-640 043 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
COCCIDIOIDAL MYCOSIS IN KIRGHIZIA,
by V. V. Teplits, and L. S. Pankratova. 1965, 8p
ABL-Trans-1600
TT-66-62397
Trans. of Vestnik Dermatologii i Venerologii (USSR), v38 n5 p80-3 1964.

Descriptors: (*Coccidioides, Diseases), Medical examination, Diagnosis, Biopsy, Blood counts, Culture media, Spores, USSR.

AD-640 045 **Field 6E, 6M**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
SOME PROBLEMS OF THE PATHOGENESIS OF PLAGUE, REPT. 1. THE SEPTICEMIC FORM OF PLAGUE.
by L. N. Burdo. Jun 65, 4p Translation-1609
TT-66-62404
Trans. of Nauchnaya Konferentsiya po Prirodnoi Ochagovosti i Profilaktike Chumy, Alma-Ata, Feb 63. Materialy, n.p., n.d. p56-7.

Descriptors: (*Pasteurella, Diseases), Blood, Bacteria, Toxins + antitoxins, Injection (Medicine), Lymphatic system, Pathology, USSR.

AD-640 048 **Field 6E, 6M**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
BACTERIOLOGICAL DIAGNOSIS OF ANTHRAX (IN AN EXPERIMENT) IN THE FIRST DAYS FOLLOWING TREATMENT,
by I. A. Dukalov, and M. F. Akulova. Jun 65, 3p Translation-1405
TT-66-62407
Trans. of Zhurnal Mikrobiologii, Epidemiologi i Immunobiologii (USSR) v41 n8 p139-40 1964.

Descriptors: (*Chemotherapy, Bacillus anthracis), (*Bacillus anthracis, Diagnosis), Diseases, Immune serums, Injection (Medicine), Streptomycins, Penicillins, Rabbits, USSR.

An experiment was performed to determine how rapidly under the influence of medical treatment the organism is free of the anthrax causative agent. Rabbits were infected subcutaneously with an 0.01 ml broth culture of B. anthracis, and after 24 and 48 hours a medicinal preparation was administered to them. Immune serum, streptomycin and penicillin in various proportions were administered for treatment. For the expanse of 12 hours following each administration of preparation (after each 2 hours) the animals were subjected to a bacteriological investigation. It was possible to detect the anthrax causative agents following the first seeding, and then positive results of seedings were noted in 46, 52, 54, 66, 70 and 72 hours following the beginning of treatment. Consequently, treatment, including specific treatment, was not an obstacle for bacteriological diagnosis. The observation showed that the most expressed medicinal effect was conditioned by streptomycin. Penicillin only retarded the development of the infectious process, but did not dispose of it completely (the death of rabbits treated with penicillin began 7--8 days later than the control). (Author)

AD-640 195 **Field 6E**
CFSTI Prices: HC$7.45 MF$2.00
Army Inst. of Dental Research, Walter Reed Medical Center, Washington, D. C.
PROSTHODONTICS: SYLLABUS.
1965, 443p

Descriptors: (*Dentistry, *Prosthetics), Anatomy, Physiology, Mouth, Tissues (Biology), Teeth, Surgery, Dental personnel, Phonetics, Obstruction (Physiology), Diagnosis, Therapy, Casting.

AD-640 196 **Field 6E**
CFSTI Prices: HC$8.70 MF$2.50
Army Inst. of Dental Research, Walter Reed Medical Center, Washington, D. C.
PREVENTIVE DENTISTRY: SYLLABUS.
1962, 567p

Descriptors: (*Dentistry, *Public health), (*Military medicine, Dentistry), Dental personnel, Education, Diseases, Mouth, Teeth, Etiology, Fluorides, Diet, Nutrition, Infections, Biopsy, Therapy, Pharmacology, Surgery, Prosthetics, Abstracts, Indexes.

The objective of the syllabus is to create a greater awareness of the need for practicing practical prevention through clinical dentistry; through greater utilization of public health measures; education of dentists, patients, commanders, parents and children to their responsibilities in the prevention of oral disease. The material is designed to assist and guide dentists who are responsible for developing programs of preventive dentistry. Included are outlines and bibliographies for lectures, conferences and discussions that may be used by preventive dentistry officers in the education of dentist, patient, commanders, and auxiliary dental health workers.

AD-640 198 **Field 6E**
Not available from CFSTI.
Army Inst. of Dental Research, Walter Reed Medical Center, Washington, D. C.
ORAL SURGERY: SYLLABUS.
1961, 889p
See also AD-640 200.

Descriptors: (*Surgery, *Mouth), (*Dentistry, Surgery), Surgical techniques, Teeth, Diseases, Diagnosis, Infections, Anatomy, Head, Pain, Therapy, Healing, Face, Bone, Anesthesia, Antibiotics, Prosthetics, Bacteria, Cancer, Neoplasms, Hemorrhage, Etiology, Salivary glands, Fractures (Bone).

AD-640 199 **Field 6E**
CFSTI Prices: HC$8.35 MF$2.25
Army Inst. of Dental Research, Walter Reed Medical Center, Washington, D. C.
APPLIED SCIENCES IN DENTISTRY: SYLLABUS. LECTURE NOTES FOR ORAL MICRO-

BIOLOGY, BIOCHEMISTRY, AND PHYSIOLOGY.
by George W. Burnett. 1962, 532p

Descriptors: (*Dentistry, Instruction manuals), Microbiology, Mouth, Diseases, Teeth, Biochemistry, Physiology, Bacteria, Protozoa, Fungi, Virus diseases, Rickettsia, Etiology, Antibiotics, Proteins, Carbohydrates, Metabolism, Nutrition, Vitamins, Salivary glands, Saliva, Mastication, Endocrine glands, Stress (Physiology), Cardiovascular system.

AD-640 200 **Field 6E**
CFSTI Prices: HC$12.00 MF$3.50
Army Inst. of Dental Research, Walter Reed Medical Center, Washington, D. C.
ORAL SURGERY: SYLLABUS.
1960, 900p
See also AD-640 198.

Descriptors: (*Surgery, *Mouth), (*Dentistry, Surgery), Surgical techniques, Teeth, Diseases, Diagnosis, Infections, Anatomy, Head, Pain, Therapy, Healing, Face, Bone, Anesthesia, Antibiotics, Prosthetics, Bacteria, Cancer, Neoplasms, Hemorrhage, Etiology, Salivary glands, Fractures (Bone).

AD-640 231 **Field 6E**
Not available from CFSTI.
Walter Reed Army Inst. of Research, Washington, D. C. Div. of Dentistry.
ORAL DIAGNOSIS AND THERAPEUTICS: SYLLABUS.
1960, 588p
Superseded by AD-640 421.

Descriptors: (*Dentistry, Instruction manuals), Mouth, Teeth, Diseases, Diagnosis, Therapy, Surgery, Radiography, Anesthesia, Pain, Hematology, Neoplasms, Etiology, Bacteria, Antibiotics, Infections, Infectious diseases, Stress (Physiology), Adaptation (Physiology), Pharmacology, Dental personnel, Medical examination, Ulcers, Necrosis, Hygiene, Protozoa, Fungi, Cancer, Prosthetics, Virus diseases, Rickettsia, Face, Bone, Medical laboratories.

AD-640 246 **Field 6E**
Not available from CFSTI.
Walter Reed Army Inst. of Research, Washington, D. C. Div. of Dentistry.
PROSTHODONTICS. SYLLABUS, 1962.
1962, 217p

Descriptors: (*Dentistry, *Prosthetics), Anatomy, Physiology, Mouth, Tissues (Biology), Surgery, Dental personnel, Phonetics, Obstruction (Physiology), Diagnosis, Therapy, Teeth, Casting.

AD-640 261 **Field 6E, 6R**
CFSTI Prices: HC$2.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
DNA SYNTHESIS IN MIXED CULTURES OF DOG LEUCOCYTES: DIFFERENTIAL EFFECT OF X-RADIATION AND FREEZE-THAWING ON CELLULAR ISOANTIGENICITY.,
by Raymond K. Main, Leonard J. Cole, Marjorie J. Jones, and Henry M. Haire. 30 Aug 66, 32p
USNRDL-TR-1063
NAVMED-MR005.08-0010

Descriptors: (*Transplantation, Immunology), (*Leukocytes, Immunology), (*Desoxyribonucleic acids, Biosynthesis), (*Radiation effects, Antigen-antibody reactions), (*Freezing, Antigen-antibody reactions), Dogs, X rays, Labeled substances, Thymidines, Genetics, Immunity, Lymphocytes, Sensitivity, Tritiated compounds, Culture media.

A marked induction of DNA synthesis occurred in 50-50 mixed cultures of peripheral blood leucocytes derived from sets of allogeneic (Beagle and mongrel) normal dog donors. DNA-synthetic activity at selected times was determined by liquid scintillation counting following pulse labeling of cell populations with 3H-thymidine. In a typical experiment, DNA synthesis is mixed cultures attained a maximum value at the 6th day (61,000 CPM) followed by a steady decline thereafter (to 7,500 CPM by day 9), as contrasted with control values (65-86 CPM). In leucocyte cultures of cells isolated and mixed on the same day, considerable DNA labeling (1900-3000 CPM) occurred at time 0. These values declined, (600 CPM at 18 hours; 230 CPM at day 2), and then rose later (2400 CPM at day 4). Incubation of individual cell suspensions for 18 hours prior to mixing eliminated the elevated zero time label. X-irradiation (2500 rads) of one (or the other) of the cell components of the mixture changed the reaction from a 'two way' to a 'one way' immunological reaction. When one (or the other) of a pair was frozen (-196C) and thawed (37C) three times and momentarily homogenized before mixing with intact allogeneic leucocytes, no induction of DNA synthesis occurred. These results suggest that leucocyte isoantigenic factors are not inactivated or destroyed by X-irradiation and can induce DNA synthesis in allogeneic leucocytes; whereas, they are labile to freeze-thawing. The results are compatible with the known chemical and immunological properties of transplantation antigens. (Author)

AD-640 347 **Field 6E**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
COCCIDIOIDIN RETEST REACTION, OBSERVATIONS OF TESTS ON A COCCIDIOIDIN-SENSITIVE PERSON,
by James T. Sinski, and Paul J. Kadull. 15 Feb 65, 3p
Availability: Published in California Medicine v103 n6 p424-6 Dec 1965.

Descriptors: (*Coccidioides, Biological products), (*Biological products, Sensitivity), Edema, Skin, Tests.

Identifiers: Skin tests.

The retest coccidioidin reaction in an apparently healthy person known to be coccidioidin-positive developed more quickly and was of a greater magnitude than that of an equivalent test in a virginal site in the same person. In both reactions, erythema, induration and/or edema were evident. Although the peak of the retest reaction was at 12 hours, readings made at 24 and 48 hours were in a definitively positive category. (Author)

AD-640 349 **Field 6E, 6C**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
RE-TEST REACTION IN TUBERCULOUS MONKEYS,
by James T. Sinski, and Wallace L. Pannier. 24 May 65, 3p
Availability: Published in American Journal of Veterinary Research v27 n117 p606-8 Mar 1966.

Descriptors: (*Tuberculin, Sensitivity), (*Monkeys, Tuberculin), Skin, Tests, Biopsy, Veterinary medicine.

Identifiers: Skin tests.

Re-test tuberculin reactions intradermal injections of 0.2 ml. of a 1:10 dilution of veterinary-type old tuberculin into the eyelids of rhesus monkeys (Macaca mulatta) produced responses as seen by eye closure at 6 hours. With readings made at 15 minutes, 6, 24, and 48 hours, the earliest virginal site reaction was seen at 24 hours. There was a general tendency for the degree of response as seen by eye closure to be less at re-testing. Several monkeys at re-test produced negative or questionable responses at 6, 24, and 48 hours, but these were inconsistent in any one monkey from one re-test to the other. The purpose of the present investigation was to compare the gross intradermal skin testing with the reaction elicited during the virginal response. The conventional intrapalpebral test technique was used; i.e., injection of tuberculin into the eyelid, which provided a small, confined, and definitely delineated area for this retesting. (Author)

AD-640 358 **Field 6**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
COCCIDIOIDIN SENSITIVITY IN CONTROL IMMUNIZED AND INFECTED GUINEA PIGS,
by James T. Sinski. 4 Nov 65, 11p
Availability: Published in Mycopathologia et Mycologia Applicata v27 n3/4 p369-78 1965.

Descriptors: (*Coccidioides, Biological products), (*Biological products, Sensitivity), (*Allergy, Biological products), Immunity, Spores, Aerosols, Skin, Tests, Antigens + antibodies, Edema, Guinea pigs.

Identifiers: Skin tests.

Delayed hypersensitivity to potent coccidioidin developed in guinea pigs immunized with dead C. immitis arthrospores and guinea pigs infected with an aerosol of C. immitis arthrospores at weeks 1 and 2. Delayed hypersensitivity in control animals sensitized by repeated intradermal testing developed at weeks 3 and 4. The delayed hypersensitivity responses were characterized grossly by indurations larger than 25 sq mm and could be seen at 6 and 24 hours after testing. Retesting reduced the size of the 24 hour indurations when compared to virginal reactions. The retest delayed reactions in infected animals had indurations at 24 and 48 hours that were larger than those in the other groups. In those animals that were skin test positive but not challenged no tube precipitins, agar gel precipitins, CF antibodies, anaphylaxis or immediate hypersensitivity were detected. Because of the inability to detect precipitins the early phase of the hypersensitivity seen at 6 hours was not considered an Arthus reaction. (Author)

AD-640 362 **Field 6E, 6M**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
THE EFFECT OF NONVIABLE AND VIABLE VACCINES IN EXPERIMENTAL COCCIDIOIDOMYCOSIS,
by John Converse. 1966, 16p
Availability: Published in The American Review of Respiratory Diseases v92 pt2 p159-74 Dec 1965.

Descriptors: (*Coccidioides, Vaccines), (*Vaccines, Viability), (*Immunity, Coccidioides), Pathology, Infections, Lymphatic system, Injection (Medicine), Skin, Dosage, Histology, Respiratory diseases, Monkeys.

Conclusions: Nonviable vaccines against coccidioidomycosis do not give complete protection from the disease. Although survival time is lengthened, and pathologic changes are lessened, infection does take place. On the other hand, a nonviable vaccine is safe for human use. Conversely, the use of a viable vaccine appears to result in solid immunity, but its use in humans is open to question at this time. In its favor is the fact that subcutaneous vaccination with ten arthrospores gives protection equal to that given by much higher vaccination doses, and appears not to disseminate beyond the regional lymph nodes. The immediate problem is to find a strain of C. immitis, or a regimen for vaccination, which will result in a four-point goal: (1) Solid immunity against respiratory infection. (2) No systemic dissemination beyond the site of inoculation. (3) No undesirable vaccination reactions, i.e., less tissue reaction at the site of inoculation, and less axillary lymphadenopathy. (4) Clearance of the organism from the tissues (vaccination site and axillary lymph nodes) in a reasonable length of time.

AD-640 373 **Field 6**
CFSTI Prices: HC$6.00 MF$1.25
Walter Reed Army Medical Center, Washington, D. C. Army Inst. of Dental Research.

PERIODONTOLOGY. SYLLABUS. A SERIES OF LECTURE NOTES ON PERIODONTOLOGY,
by Wilfred B. Bell. 1962, 211p

Descriptors: (*Dentistry, Instruction manuals), Prosthetics, Histology, Medical examination, Teeth, Diseases, Mouth, Obstruction (Physiology), Radiography, Therapy, Necrosis, Ulcers, Surgery, Bone, Calculi, Microbiology, Nutrition.

CONTENTS: Clinical and histologic examination of the gingiva: The periodontium; The inflammatory process; The periodontal lesions; Clinical and radiographic examination of the periodontal patient; Case analysis; The rationale for periodontal treatment; Scaling and subgingival curettage; Acute necrotizing ulcerative gingivitis; Gingivectomy (Gingivectoplasty); Osseous surgery; Mucogingival surgery; Patient home treatment; Principles of occlusion and traumatism; Theory and principles of periodontal splinting; Periodontal splints; Calculus; Microbiology of periodontal disease; Nutrition and periodontal disease; Systemic disturbances as related to periodontal disease.

AD-640 394 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
USAF Epidemiological Lab., Lockland AFB, Tex.
GASTROINTESTINAL AND DIARRHEAL DISEASE SURVEY, IZMIR, TURKEY.
Rept. for 19 Jul-30 Sep 65,
by William E. Meekins. 30 Sep 65, 8p
Proj. AF-65-3

Descriptors: (*Shigella, Digestive system diseases), (*Digestive system diseases, Etiology), Diarrhea, Shigella dysenteriae, Shigella flexneri, Shigella boydii, Shigella sonnei, Turkey.

A preliminary survey was conducted to gain information relative to the more common causes of gastrointestinal and diarrheal diseases experienced by the American population in Izmir during the summer months of July, August, and September 1965. (Author)

AD-640 408 **Field 6E**
Not available from CFSTI.
Walter Reed Army Inst. of Research, Washington, D. C. Div. of Dentistry.
PROSTHODONTICS SYLLABUS.
1953, 315p
Superseded by AD-640 422.

Descriptors: (*Dentistry, Instruction manuals), Anatomy, Physiology, Therapy, Mouth, Prosthetics, Teeth, Mastication, Diagnosis, Dental personnel.

AD-640 409 **Field 6E**
Not available from CFSTI.
Walter Reed Army Inst. of Research, Washington, D. C. Div. of Dentistry.
PROSTHODONTICS SYLLABUS.
1961, 349p
Superseded by AD-640 422.

Descriptors: (*Dentistry, Instruction manuals), Anatomy, Physiology, Therapy, Mouth, Prosthetics, Teeth, Mastication, Diagnosis, Dental personnel.

AD-640 421 **Field 6E**
CFSTI Prices: HC$9.60 MF$3.00
Walter Reed Army Inst. of Research, Washington, D. C. Div. of Dentistry.
ORAL DIAGNOSIS AND THERAPEUTICS: SYLLABUS.
1960, 752p
Supersedes AD-640 231.

Descriptors: (*Dentistry, Instruction manuals), Mouth, Teeth, Diseases, Diagnosis, Therapy, Surgery, Radiography, Anesthesia, Pain, Hematology, Neoplasms, Etiology, Bacteria, Antibiotics, Infections, Infectious diseases, Stress (Physiology), Adaptation (Physiology), Pharmacology, Dental personnel, Medical examination, Ulcers, Necrosis, Hygiene, Protozoa, Fungi, Cancer, Prosthetics, Virus diseases, Rickettsia, Face, Bone, Medical laboratories.

AD-640 422 **Field 6E**
Not available from CFSTI.
Walter Reed Army Inst. of Research, Washington, D. C. Div. of Dentistry.
PROSTHODONTICS SYLLABUS.
1963, 420p
Supersedes AD-640 408, AD-640 409.

Descriptors: (*Dentistry, Instruction manuals), Anatomy, Physiology, Therapy, Mouth, Prosthetics, Teeth, Mastication, Dental personnel, Diagnosis, Phonetics.

N66-27201 **Field 6E**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
ON PAROXYSMAL AURICULAR FIBRILLATION IN PATIENTS WITH ATHEROSCLEROTIC CARDIOSCLEROSIS.
O Pristupoobraznoy Forme Mertsatel'noy Aritmii U Bol'nykh Ateroskleroticheskim Kardiosklerozom
by V. S. Solovyeva, and Z. M. Volynskiy. Nov 63, 10p NASA-TT-8557
Transl. Into English From Terap. Arkh. (Moscow), V. 33, No. 7, Jul. 1961 P 10-16

Descriptors: *Cardiovascular system, *Fibrillation, *Heart disease, Atherogenic, Auricle, Cardiovascular, Disease, Heart, Heat, Muscle, Paroxysm, System.

For abstract, see S 04 15.

N66-29754 **Field 6E**
CFSTI Prices HC$3.00 MF$0.50
Naval School Of Aviation Medicine, Pensacola, Fla.
A STANDARD TECHNIQUE FOR TEMPORAL BONE PREPARATION.
by M. Igarashi. 2 Mar 66, 53p NASA-CR-76046
NASA ORDER R-93
Its Monograph 13

Descriptors: *Ear, *Histology, *Labyrinth, *Morphology, *Otology, Anatomy, Biology, Bone, Membrane, Organ, Preparation, Slide, Standard, Technique.

For abstract, see S 04 16.

ORNL-3942 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
SEMIANNUAL CONTRACT PROGRESS REPORT TO THE NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES, SEPTEMBER 1, 1965 TO MARCH 1, 1966,
by Norman G. Anderson, George B. Cline, Richard M. Jamison, and Warren W. Harris. Mar 66, 24p

Descriptors: (*Reports, *Infectious diseases).

For abstract, see N 20 19.

ORNL-3942-App **Field 6E**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
APPENDIX TO SEMIANNUAL CONTRACT PROGRESS REPORT TO THE NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES, SEPTEMBER 1, 1965 TO MARCH 1, 1966,
by Norman G. Anderson, George B. Cline, Richard M. Jamison, and Warren W. Harris. Mar 66, 36p

Descriptors: (*Reports, *Infectious diseases).

For abstract, see N 20 19.

PB-172 409 **Field 6E**
CFSTI Prices: HC$7.00 MF$1.50
Westinghouse Research Labs., Pittsburgh, Pa.
STUDIES BASIC TO CONSIDERATION OF ARTIFICIAL HEART RESEARCH AND DEVELOPMENT.
Task 3 on technology survey and data compilation, volume 3-C appendices.
1965, 308p

Descriptors: (*Heart, *Mechanical organs), Power supplies, Nuclear energy, Radioactive isotopes, Heat transfer, Pumps, Radiological dosage, Energy conversion, Materials, Polymers, Cardiovascular system, Implants, Blood circulation, Blood coagulation, Prosthetics, Surgery, Tolerances (Physiology), Medical research, Electrophysiology.

Identifiers: Extracorporeal circulation.

PB-172 415 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Avco Everett Research Lab., Everett, Mass.
STUDIES BASIC TO CONSIDERATION OF ARTIFICIAL HEART RESEARCH AND DEVELOPMENT PROGRAM. TASK VII. PERFORMANCE CRITERIA FOR THE ARTIFICIAL HEART,
Task completion rept.
Feb 66, 10p
Contract PH-43-66-7
See also PB-172 414.

Descriptors: (*Heart, *Mechanical organs), Therapy, Prosthetics, Psychology, Costs, Implants, Tolerances (Physiology), Surgery, Blood coagulation, Blood circulation, Hemolysis, Maintainability, Heat production (Biology), Standards, Medical personnel.

General performance criteria derived for the artificial heart can be categorized as Patient Criteria, Device Criteria, Economics and Personnel. Patient Requirements: The restored patient must be ambulatory, able to leave the hospital and attain reasonable self sufficiency and freedom of movement. In early phases of artificial heart usage, the patient may be localized near a hospital or center with specialized facilities. As the system develops, and artificial heart information and capabilities become widespread, the asymptomatic patient can anticipate a fairly normal life, work, and substantial freedom of movement. Psychological considerations for a restored, ambulatory patient would indicate inplantation of the greatest possible number of system components, and inaudibility of all mechanisms. Device Requirements: Requirements for temporary devices are few and simple. Requirements for permanent devices are more numerous and stringent, and divide naturally into categories of the truly essential and the merely convenient. Economics and Personnel: It is pointed out that problems of economics and personnel, though demonstrably soluble in a general sense, nevertheless are best solved in the context of medical requirements, with patient needs governing program goals and economics, and maximum device complexity governing personnel selection and training. (Author)

PB-172 426 **Field 6E**
CFSTI Prices: HC$4.00 MF$1.00
General Dynamics/Convair, San Diego, Calif.
STUDIES BASIC TO CONSIDERATION OF ARTIFICIAL HEART RESEARCH AND DEVELOPMENT PROGRAM. TASK I REPORT. ASSESSMENT OF THE NEED AND DEFINITION OF THE PROBLEM FOR THE DEVELOPMENT OF AN ARTIFICIAL HEART.
10 Sep 65, 130p GDC-DBD-65-041
Contract PH43-65-1059

Final summary rept. catalogued as PB-169 835. See also PB-172 427 and PB-172 428. Research supported in part by Natl. Heart Inst.

Descriptors: (*Heart, *Mechanical organs), Research program administration, Cardiovascular diseases, Implants, Mortality rates, Costs, Therapy, Transplantation, Atherosclerosis, Aging (Physiology), Surgery, Manpower studies, Medical personnel, Sociology, Psychology, Statistical data.

Contents: Over-all view of the total problem; Need for a technical plan for future research and relationship of present study to development of the research plan; Implementation of the research plan for development of an artificial heart; Indications for clinical use of artificial heart (and heart-assist devices) and estimates of numbers of persons benefited; Clinical application and evaluation of artificial hearts and related heart-assist devices; Manpower requirements and considerations; Philosophical, psychological, and sociological considerations.

PB-172 427 **Field 6E**
CFSTI Prices: HC$4.00 MF$1.00
General Dynamics/Convair, San Diego, Calif.
STUDIES BASIC TO CONSIDERATION OF ARTIFICIAL HEART RESEARCH AND DEVELOPMENT PROGRAM. TASK II REPORT. CHARACTERIZATION OF BIOMEDICAL AND TECHNOLOGICAL PROBLEMS.
1 Oct 65, 125p GD/C-DBD-65-044
Contract PH43-65-1059
Final summary rept. catalogued as PB-169 835. See also PB-172 426. Research sponsored in part by Natl. Heart Institute.

Descriptors: (*Heart, *Mechanical organs), Cardiovascular system, Tolerances (Physiology), Implants, Hemolysis, Blood coagulation, Lungs, Pathology, Acidosis, Instrumentation, Installation, Materials, Test methods, Maintainability, Power supplies, Pumps, Fluid mechanics, Thermodynamics, Sociology.

Contents: Biomedical problems: Tissue rejection/foreign body reaction; Hemolysis/coagulation/clotting; Pulmonary congestion/acidosis; Measurement/instrumentation/installation; Testing procedures. Technology problems: Materials and mechanisms; Reliability and maintainability; Research technology; The power problem and requirements; The pump/power conversion and transmission; Installation technology; Materials and packaging; Personnel and training; Data handling and control; Control mechanisms; Fluid dynamics; Thermodynamics. Religious, Ethical, and Economic Problems.

PB-172 428 **Field 6E**
CFSTI Prices: HC$7.00 MF$1.75
General Dynamics/Convair, San Diego, Calif.
STUDIES BASIC TO CONSIDERATION OF ARTIFICIAL HEART RESEARCH AND DEVELOPMENT PROGRAM. TASK III REPORT. TECHNOLOGY SURVEY AND REFERENCE DATA COMPILATION.
3 Dec 65, 391p GD/C-DBD-65-048
Contract PH43-65-1059
Final summary rept. catalogued as PB-169 835. See also PB-172 427. Research supported in part by Natl. Heart Inst.

Descriptors: (*Heart, *Mechanical organs), Prosthetics, Standards, Power supplies, Pumps, Control systems, Electrophysiology, Cardiovascular system, Blood circulation, Blood coagulation, Monitors, Diagnosis, Blood chemistry, Surgical techniques, Medical personnel, Mathematical models, Implants.

Identifiers: Extracorporeal circulation.

PB-172 433 **Field 6E**
CFSTI Prices: HC$5.00 MF$1.00
Thermo Electron Engineering Corp., Waltham, Mass.
ARTIFICIAL HEART PROGRAM, TASK I: ASSESSMENT AND DEFINITION OF THE PROBLEM.
Dec 65, 166p TE-15-66 (R)
Contract PH-43-66-9
Rept. on Artificial Heart Program. Prepared in cooperation with The Children's Hospital Medical Center, Boston, Mass.

Descriptors: (*Heart, *Mechanical organs), Statistical data, Mortality rates, Cardiovascular diseases, Prosthetics, Implants, Aorta, Rheumatic diseases, Electrophysiology, Bibliographies.

Identifiers: Pacemakers.

Contents: Mortality of heart disease; The morbidity of cardiovascular disease; Need for prosthetic devices in cardiovascular disease; Current status of pacemakers; Current status of aortic and mitral valve prosthesis.

AD-639 641 **See Field 6O**

AD-639 775 **See Field 6A**

AD-639 785 **See Field 6C**

AD-639 868 **See Field 5I**

AD-640 166 **See Field 6N**

AD-640 344 **See Field 6M**

AD-640 357 **See Field 6M**

6F. ENVIRONMENTAL BIOLOGY

N66-28418 **Field 6F**
CFSTI Prices HC$3.00 MF$0.50
North American Aviation, Inc., Downey, Calif. Space And Information Systems Div.
STUDY OF THE LIMINAL ANGLE OF A PLAGIOGEOTROPIC ORGAN UNDER WEIGHTLESSNESS FINAL REPORT.
by S. P. Johnson. 29 Mar 64, 56p NASA-CR-75686, SID-64-700
Contract NAS2-1539

Descriptors: *Geotropism, *Plant (biol), *Weightlessness, Angle, Exchange, Flight, Gas, Growth, Illumination, Leaf, Limit, Nutrient, Reduction, Stress, Temperature.

For abstract, see S 04 16.

N66-28425 **Field 6F**
CFSTI Prices HC$2.00 MF$0.50
Chicago Univ., Ill. Dept. Of Biophysics.
EXOBIOLOGY STUDY - ANALYTICAL SYSTEMS FOR BIOLOGICAL STUDY OF MARS. THE ROLE OF ELECTRON MICROSCOPY AND ELECTRON OPTICAL TECHNIQUES IN EXOBIOLOGY.
by H. Fernandez-moran. Apr 65, 28p NASA-CR-75702
Grant NSG-441
Revised

Descriptors: *Electron microscopy, *Extraterrestrial life, *Mars probe, *Optical equipment, Biology, Electron, Equipment, Mars, Mars (planet), Microscopy, Molecule, Optics, Study, Technique.

For abstract, see S 04 16.

N66-28819 **Field 6F**
CFSTI Prices HC$5.00 MF$1.25
Lockheed Missiles And Space Co., Sunnyvale, Calif.
EXPERIMENTAL STUDY OF STERILE ASSEMBLY TECHNIQUES, VOLUME I FINAL REPORT.
by W. Hansen. 21 Mar 65, 187p NASA-CR-75789, M-56-65-1, VOL. I
Contracts NAS7-100, JPL-950993
Prepared For Jpl

Descriptors: *Electronic equipment, *Manned spacecraft, *Spacecraft components, *Sterilization, Air, Assembly, Box, Circuit, Component, Contamination, Electronic, Equipment, Ethylene, Freon 12, Glove, Heat, Nitrogen, Oxide, Soldering, Spacecraft, Subsystem, Technique.

For abstract, see S 04 16.

N66-29750 **Field 6F**
CFSTI Prices HC$1.00 MF$0.50
Naval School Of Aviation Medicine, Pensacola, Fla.
BIOCHEMICAL CHANGES OCCURRING WITH ADAPTATION TO ACCELERATIVE FORCES DURING ROTATION.
by J. K. Colehour, and A. Graybiel. Apr 66, 18p
NASA-CR-76042, NAMI-959
NASA ORDER R-93

Descriptors: *Biological effect, *Human reaction, *Motion sickness, *Rotating environment, *Stress (biol), Adaptation, Biochemistry, Biological, Biology, Change, Effect, Environment, Human, Motion, Phenomenon, Reaction, Rotating, Sickness, Stress.

For abstract, see S 04 16.

N66-35772 **Field 6F**
CFSTI Prices HC$2.00 MF$0.50
Iit Research Inst., Chicago, Ill.
LIFE IN EXTRATERRESTRIAL ENVIRONMENTS QUARTERLY STATUS REPORT, 15 MAY - 15 AUG. 1966.
by C. A. Hagen. 1966, 31p NASA-CR-77612, IITRI-L6023-6
Contract NASR-22

Descriptors: *Atmospheric pressure, *Bacillus, *Carbon dioxide, *Extraterrestrial environment, *Germination, Atmosphere, Bacteria, Barometer, Carbon, Cell, Dioxide, Earth, Ecology, Environment, Extraterrestrial, Growth, Mars, Population, Pressure, Soil, Spore, Vegetative.

For abstract, see S 04 21.

N66-36371 **Field 6F**
CFSTI Prices HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
DESERT ALGAE - SOIL CRUSTS AND DIAPHANOUS SUBSTRATA AS ALGAL HABITATS.
by G. B. Blank, and R. E. Cameron. 15 Jul 66, 41p
NASA-CR-77982, JPL-TR-32-971
Contract NAS7-100

Descriptors: *Algae, *Desert, *Ecology, *Soil, Crust, Development, Distribution, Geography, Isolation, Lichen, Matter, Organic, Quartz, Substrate, Terrestrial.

For abstract, see S 04 21.

PB-173 257 **Field 6F, 8H**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Reclamation, Denver, Colo. Water Conservation Branch.
ANNUAL REPORT OF PHREATOPHYTE ACTIVITIES 1965,
by P. M. Turner. 1 Jun 66, 42p WC-26

Descriptors: (*Plants (Botany), Pest control), (*Water supplies, *Evapotranspiration), Natural resources, Herbicides, Effectiveness, Deserts, Ecology, Carbohydrites, Growth substances, Hydrology, Soils, Moisture, Trees, Reviews.

Identifiers: Tamarax pentandra, Phreatophytes.

The report describes activities of the Bureau of Reclamation on phreatophyte research and control. Information on the programs at Denver and in the regions is included. Objectives of the programs are to find: (1) the most economical means of controlling saltcedar and other phreatophytes in areas of critical water shortage, (2) replacement vegetation having lower water requirements, preferably with economic value, (3) management procedures to assure survival of replacement vegetation. At Denver, saltcedar plants are greenhouse and nursery cultured and used as test specimens for foliar applied herbicides. Root samples were analyzed for carbohydrate content to correlate with herbicide effect and growth factors. Helicopter herbicide spraying was performed on 411 acres of saltcedar around Rye Patch Reservoir north of Lovelock, Nevada, and Lahontan Reservoir east of Carson City, Nevada. Water measurements are being made in a prototype area located between Bernardo and San Acacia, New Mexico, on the Middle Rio Grande Project. Over 6,000 acres of phreatophytes have been cleared, and changes in water use for this area will be determined. (Author)

AD-639 687 See Field 5J

AD-640 016 See Field 15B

AD-640 038 See Field 6E

AD-640 384 See Field 4B

AD-640 482 See Field 6G

PB-172 974 See Field 1B

6G. ESCAPE, RESCUE, AND SURVIVAL

AD-640 482 Field 6G, 6F, 8F
CFSTI Prices: HC$3.00 MF$0.75
Wisconsin Univ., Madison.
LITERATURE REVIEW OF ESKIMO KNOWLEDGE OF THE SEA ICE ENVIRONMENT.
Preliminary rept. for 1 Oct 64-1 Oct 65,
by Richard K. Nelson. May 66, 65p
Contract AF 41 (609)-2613
Proj. AF-8238
Task 823802
AAL-TR-65-7

Descriptors: (*Alaska, *Survival), Ice, Stress (Physiology), Humans, Meteorological parameters, Ecology, Food, Reviews.

Identifiers: Eskimos.

The report concerns travel and survival on Arctic sea ice. Information is totally derived from literature and deals mainly with Alaskan Eskimo practices but includes some from areas of the Canadian Arctic. Much of the information is anecdotal and unsystematic observation made by pioneers and explorers familiar with the Arctic and the Eskimo. The report lists environmental phenomena or 'stimuli' which are likely to occur in the Arctic, and the activities or 'responses' which the sea ice traveler must make in order to cope with these external forces or to utilize resources which the environment provides. The author has segregated a series of external forces and resources, and has suggested one or several ways to deal with them. These are divided into the physical environment and biological environment. The first includes temperature, wind, precipitation, atmospheric phenomena, astronomical phenomena, and the sea ice itself. The second includes all sources of energy available to the sea ice hunter: invertebrates, fish, birds and mammals. (Author)

6H. FOOD

AD-639 802 Field 6H
CFSTI Prices: HC$4.00 MF$0.75
Army Natick Labs., Mass. Food Div.
DEVELOPMENT OF DEHYDRATED AND BITE-SIZED FOOD ITEMS.
Final rept. Mar 63-Mar 64,
by Herbert A. Hollender, and Mary Klicka. Dec 65, 112p
Proj. 7164
Task 716405
AMRL-TR-65-160

Descriptors: (*Astronauts, *Diet), (*Dehydrated foods, Preparation), Food, Nutrition, Preparation, Encapsulation, Packaging, Space medicine.

Prolonged aerospace missions necessitate severe restrictions on the weight and size of all material carried on board the space vehicle. These limitations must be applied to the astronauts' food, as well. Therefore to meet these restrictions and to provide optimum nutrition, the US Army Natick Laboratories (NLABS) developed, evaluated, and supplied, a variety of prototype dehyrated and bite-sized foods to the Aerospace Medical Research Laboratories for further evaluation. The formulations and production guides for each food item are included. Pillsbury developed various dessert bite-sized food pieces as well as a good food coating for encapsulating the food cubes for use in aerospace systems. Compressed 0.75 in. cubes with rounded corners and edges were suggested for aerospace missions. The encapsulation process employed two immiscible systems, a film former in the continuous phase surrounding a liquid, or once liquid, discontinuous phase, and a plasticizer to form the stable dispersion. The stable dispersion when applied to the dessert bits adhered tenaciously and then air dried to a smooth, non-sticky, moisture resistant, and oxygen resistant coating. The best coating formula consisted of 45% melted lard, 9% sodium caseinate, 2% gelatin, 3% cornstarch, 41% sucrose, and 100 ml water. On the basis of taste panel evaluations of these foods, an acceptable, nutritious 3-day menu cycle with 4 meals per day can be recommended for aerospace missions. The menu supplied 2500 kcal per day, of which 48.6% of the energy was supplied by carbohydrates, 32.7% by fat, and 18.7% by protein. (Author)

AD-640 522 Field 6H
CFSTI Prices: HC$3.00 MF$0.75
Pillsbury Mills, Inc., Minneapolis, Minn.
MIGRATION OF FLEXIBLE PACKAGING COMPONENTS INTO FOODS.
Final technical rept., 24 Jun 64-1 Sep 65,
by Robert L. Ferm. Jun 66, 61p
Contract DA-19-129-AMC-384 (N)
Proj. DA-1M624101D552
Task 02
USA-NLABS-TR-66-56-CD

Descriptors: (*Food, Contamination), (*Packaging, Food), Films, Degradation, Containers, Laminated plastics, Adhesives, Temperature, Solvent extraction.

Solvent extractions were conducted on 4-foil-laminated materials with films of Lexan-polycarbonate, Rilsan-Nylon 11, Kodar-polyester, and Teflon-fluorocarbon. The film residues extracted were principally laminating adhesives which migrate through or permeate the films. An exception was Lexan-polycarbonate which showed traces of film degradation. All films studied appeared to have excellent thermal stability at temperatures up to 275F. No significant volatile extractives were evident. Extraction yields of the four films tested were all less than maximums specified in Federal Regulations even at extraction conditions in excess of regulation procedures. Procedures were developed using free fats as simulated solvents. Results gave 90-100% recovery of film residues. The development of the above procedure enabled the assessment of existing FDA regulations regarding film extractives at high temperatures (250F and higher). The Federal Regulations imply that film extractions with heptane at 150F for 2 hours result in amounts of residue five times larger than with a food product. From results obtained, it appears that the ratio of heptane extractables at 150F to fat extractables at 275F varies from one film material to another and is not fixed. (Author)

AD-640 252 See Field 14B

PB-173 061 See Field 13D

6J. INDUSTRIAL (OCCUPATIONAL) MEDICINE

AD-640 356 See Field 6L

6K. LIFE SUPPORT

AD-640 055 Field 6K
CFSTI Prices: HC$1.00 MF$0.50
Materials Advisory Board, NAS-NRC, Washington, D. C.
INFORMAL STUDY AND RECOMMENDATIONS REGARDING CORROSION.
Aug 66, 14p MAB-227-M
Contract DA-49-083-OSA-313

Descriptors: (*Corrosion, State-of-the-art reviews), Corrosion resistance, Engineering personnel, Training.

A broad look was taken of the corrosion problem in order to recommend whether or not a deeper study by another committee was needed. There was agreement as to the unsatisfactory manner in which current corrosion problems are usually handled, and regarding the inadequate training of engineers. The formation of a group to provide documentation on a number of specific items, which are listed, was strongly recommended. The topics requiring such study include a summary of the major corrosion problems, our capabilities for attacking corrosion problems, the effectiveness of present methods, and areas ripe for improvement in dealing with corrosion. (Author)

AD-640 058 Field 6K, 9B
CFSTI Prices: HC$1.00 MF$0.50
Brown Univ., Providence, R. I. Div. of Engineering.
THE COMPUTATION OF CONTINUOUS TRANSFORMATION DIAGRAMS FROM ISOTHERMAL DATA,
by L. M. Markowitz, and M. H. Richman. Aug 66, 18p E34
Contract SD-86

Descriptors: (*Transformations, Graphics), Programming (Computers), Metals, Cooling, Steel, Austenite, Temperature, Heat treatment.

A basic program is presented to allow high speed digital computation of continuous transformation diagrams from data available in the form of isothermal transformation diagrams. The program follows the method of Grange and Kiefer ('Transformation of Austenite on Continuous Cooling and Its Relation to Transformation at Constant Temperature', Trans. ASM., 32, (1941), 85-116), and continuous transformation diagrams computed by this method are shown to agree favorably with experimental diagrams. (Author)

AD-640 062 Field 6K, 6N
CFSTI Prices: HC$1.00 MF$0.50
Civil Aeromedical Inst., Oklahoma City, Okla.
SELECTED FACIAL MEASUREMENTS OF CHILDREN FOR OXYGEN-MASK DESIGN,
by Joseph W. Young. Apr 66, 16p
AM-66-9

Descriptors: (*Oxygen masks, Design), (*Children, Oxygen masks), (*Anthropometry, Children), (*Face, Measurement), Infants, Adolescents, Head.

Requirements for design of oxygen masks and other equipment for effective protection of chil-

dren in high-altitude flight necessitate a new facial-measurement series. A program to meet this demand was initiated to (1) select a basic set of standard measurements, (2) define and standardize new measurements of specific structural features based on well-defined or established anatomical landmarks, (3) conduct a series of surveys on selected representative children of all ages, and (4) determine significant dimensional ranges of facial structures for use as standardized design criteria. The new series provides 10 standard and 8 new facial measurements, all of which are dimensionally related to other common measuring points to permit a comparison with other series of facial measurements. This survey is based upon a selected population of 978 Caucasian subjects of ages 1 month through 17 years. The number of subjects in each age and sex group was controlled to assure constant sample distribution throughout the series. A continuation of this study is proposed to include representative populations for both the Negro and Mongoloid types. (Author)

N66-27228 **Field 6K**
CFSTI Prices HC$2.00 MF$0.50
General Dynamics/convair, San Diego, Calif.
LIFE SUPPORT SYSTEM FOR SPACE FLIGHTS OF EXTENDED TIME PERIODS - LIQUID/GAS SEPARATION MECHANISMS.
by J. Burnett, and S. Mc cunney. 13 Sep 66, 37p NASA-CR-66060
Contract NAS1-2934
Its Rept.-64-26231

Descriptors: *Life support system, *Liquid-gas mixture, *Separator, Air, Dynamic, Flight, Gas, Life, Liquid, Long, Mixture, Separation, Space, Spacecraft, Static, Support, System, Water.

For abstract, see S 04 15.

N66-28380 **Field 6K**
CFSTI Prices HC$2.00 MF$0.50
Northrop Space Labs., Hawthorne, Calif.
THE DEVELOPMENT OF AN ADVANCED SYSTEM TO COOL A MAN IN A PRESSURE SUIT.
by J. Felder, C. F. Lombard, and R. B. Olson. 1966, 50p NASA-CR-65382, NSL-66-73
Contract NAS9-4925

Descriptors: *Cooling system, *Man, *Pressurized suit, Boiler, Conductivity, Contact, Cooling, Pressure, Pressurization, Skin, Space, Suit, System, Water, Wick.

For abstract, see S 04 15.

N66-29206 **Field 6K**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EXPLORATORY STUDY OF MAN'S SELF-LOCOMOTION CAPABILITIES WITH A SPACE SUIT IN LUNAR GRAVITY.
by W. D. Krasnow, and A. A. Spady Jr. Jul 66, 17p NASA-TN-D-2641
Film Supplement To This Report Is Available On Loan From Langley Research Center

Descriptors: *Earth, *Environment simulation, *Gravitation, *Human performance, *Lunar gravitation, *Pressurized suit, Angular, Coordination, Environment, Gravity, Human, Jump, Leg, Lunar, Movement, Performance, Pressure, Pressurization, Run, Simulation, Simulator, Suit, Walking.

For abstract, see S 04 16.

N66-29419 **Field 6K**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
A SURVEY OF LIFE-DETECTION EXPERIMENTS FOR MARS.
Aug 63, 77p NASA-TM-X-54946

Descriptors: *Extraterrestrial life, *Life detector, *Mars (planet), Chromatograph, Detection, Detector, Experiment, Extraterrestrial, Gas, Gulliver program, J-band, Life, Mariner program, Mass, Multivator, Optical, Planetary, Rotation, Spectrometer, Wolf trap life detector.

For abstract, see S 04 16.

AD-639 659 **See Field 7D**

AD-640 255 **See Field 6S**

N66-36131 **See Field 22B**

6L. MEDICAL AND HOSPITAL EQUIPMENT

AD-640 342 **Field 6L**
Not available from CFSTI.
Army Biological Center, Frederick, Md.
EMERGENCY DISINFECTION OF OPERATING ROOM AND PATIENT WARD WITH BETA-PROPIOLACTONE,
by Manuel S. Barbeito. 1966, 6p
Availability: Published in Journal of the American Hospital Association v40 Mar 16 1966.

Descriptors: (*Hospitals, *Germicides), Hygiene, Sanitary engineering, Lactones, Ventilation.

A hospital ward and an operating room were disinfected by disseminating beta-propiolactone (BPL) in a concentration of one gal. of BPL for each 12,000 to 16,000 cu. ft. of space. The temperature was elevated to 74F. and the relative humidity to 75 per cent, the supply and exhaust ventilation systems were turned off, and all seams and openings were blocked before BPL was disseminated. It was possible to enter the disinfected areas after two hours of forced aeration. However, overnight aeration is advisable whenever BPL is used. The efficacy of BPL disinfection was determined by seeding areas with spores of Bacillus subtilis var. niger. No B. subtilis was recovered from these areas following disinfection.

AD-640 356 **Field 6L, 6J**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
HAZARDS OF MOUTH PIPETTING,
by G. Briggs Phillips, and Sam P. Bailey. Nov 64, 3p
Availability: Published in American Journal of Medical Technology v32 n2 p127/91-129/93 Mar-Apr 1966.

Descriptors: (*Pipettes, Hazards), Mouth, Accidents, Infections, Biological laboratories.

AD-639 635 **See Field 6N**

6M. MICROBIOLOGY

AD-639 765 **Field 6M**
Not available from CFSTI.
Army Medical Research and Nutrition Lab., Denver, Colo. Microbiology Div.
SELECTIVE SCREENING FOR QUANTITATIVE URINE CULTURES,
by O. L. Weiser, and J. S. Emerson. 9 Oct 65, 2p
Availability: Published in The American Journal of Clinical Pathology v45 n5 p649-50 1966.

Descriptors: (*Urine, Analysis), Bacteria, Quantitative analysis, Culture media, Biological stains, Catalase.

Rapid screening procedures, which would eliminate most of the 'negative' urine cultures (less than 100,000 bacteria per ml.) would undoubtedly increase laboratory use of the more involved quantitative methods. The report describes screening methods which can be used to determine whether or not quantitative bacterial counts should be made on urine specimens. (Author)

AD-639 791 **Field 6M**
CFSTI Prices: HC$2.00 MF$0.50
Army Biological Labs., Frederick, Md.
L-FORMS OF BACTERIA,
by V. D. Timakov, and G. Ya. Kagan. Feb 64, 26p Trans-1018
TT-65-41030
Trans. of Akademiya Meditsinskikh Nauk SSSR, Vestnik, v15 n11 p25-38 1960.

Descriptors: (*Bacteria, Mutations), Growth, Morphology (Biology), Culture media, Bacteriophages, Inhibition, Biosynthesis, Desoxyribonucleic acids, Adaptation (Physiology), Resistance (Biological), Pleuropneumonia-like organisms, Genetics, Penicillins, Experimental data, Reviews, USSR.

AD-639 795 **Field 6M**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
PROPERTIES OF ANTIBODIES FIXED ON PARTICLES AND THE PERSPECTIVE OF THEIR APPLICATION IN MICROBIOLOGY,
by A. K. Adamov. Jul 65, 10p Trans-1478
TT-66-62372
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR), v41 n11 p3-7 1964.

Descriptors: (*Antigens + antibodies, Microbiology), Immune serums, Agglutinins, Particles, Bacteria, Sensitivity, USSR.

Conclusions: The high sensitivity and specificity of suspension antibodies was caused by peculiarities in the structure of antibody--particle complexes, combining the properties of particles and immune antibodies. Suspension antibodies are suited for the investigation of the nature of antigens and the identification of certain species of pathogenic microbes (causative agents of plague, botulism, and others) which cannot be identified with the aid of molecular antibodies. The employment of suspension antibodies opens wide possibilities for a more thorough study of the antigenic structure of microbes. (Author)

AD-639 798 **Field 6M**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
STANDARDIZATION OF CONDITIONS FOR SETTING UP THE HEMAGGLUTINATION INHIBITION REACTION WITH THE NONINFECTIVE ANTIGEN OF THE TICK-BORNE ENCEPHALITIS VIRUS,
by A. I. Rezepova. 1966, 9p Trans-1606
TT-66-62376
Trans. of Voprosy Virusologii (USSR), v8 n2 p180-4 1963.

Descriptors: (*Serodiagnosis, Test methods), (*Test methods, Standardization), Arboviruses, Antigens + antibodies, Agglutinins, Erythrocytes, Immune serums, Animals, Humans, Immunity, USSR.

Identifiers: Hemagglutination-inhibition tests.

AD-640 044 **Field 6M**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
ON THE PROPERTIES AND TECHNIQUE OF OBTAINING THE STREPTOCOCCUS AEROSOL IN EXPERIMENTAL CONDITIONS,
by E. P. Sinelnikova. Jul 65, 9p ABL-Trans-1467
TT-66-62403
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) n1 p120-3 1965.

Descriptors: (*Streptococcus, Bacterial aerosols), (*Bacterial aerosols, Viability), Stability, Humidity, Temperature, Experimental data, USSR.

CONCLUSIONS: An experimental model of a kinetically stable aerosol of beta-hemolytic streptococcus was obtained. Blood serum and gelatin had a protective effect on beta-hemolytic streptococcus in the experimental aerosol. A low temperature (4 degrees) aided the survival of beta-hemolytic streptococcus in the experimental aerosol. Viability of beta-hemolytic streptococcus, 'protected' by gelatin in Ringer-Locke's liquid, in the bacterial cloud did not depend on the relative humidity of air. (Author)

AD-640 046 **Field 6M**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
AN EXPERIMENTAL STUDY OF POLYDISPERSE BACTERIAL AEROSOLS. REPT. III. A STUDY OF DIPHTHERIA BACILLUS AEROSOLS,
by V. P. Zhalko Titarenko. Jul 65, 9p Translation-1607
TT-65-31214
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) n2 p68-73 1965. See also AD-619 406 and AD-620 498.

Descriptors: (*Corynebacterium diphtheriae, Bacterial aerosols), (*Bacterial aerosols, Viability), Evaporation, Necrosis, Particles, Experimental data, USSR.

CONCLUSIONS: As a result of a study of the survival rate of diphtheria microbes in an aerosol (beginning with the 3rd minute following spraying and continuing for the next 120 minutes) it was established that it is found in dependence on the evaporation of water: In drops with slowed down evaporation (saliva) the survival rate turned out to be higher than in the rapidly evaporating aqueous particles. The necrosis of microbes in an aerosol increased sharply at a temperature of 35 degrees and at a temperature below zero the viability of all the diphtheria cells was preserved. The highest survival rate for diphtheria microbes was noted in the aerosol during the period when there was a prevalence of large particles. In the presence of small droplet fractions their rate of necrosis increased. (Author)

AD-640 050 **Field 6M**
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
MATERIALS ON THE VARIABILITY OF P. PESTIS UNDER NATURAL CONDITIONS,
by N. A. Yeremitskaya. Jun 65, 4p ABL-trans-1614
TT-66-62409
Trans. of mono. of Nauchnaya Konferentsiya po Prirodnoi Ochagovosti i Profilaktike Chumy Materialy, Alma-Ata, Feb 1963.

Descriptors: (*Pasteurella pestis, Diseases), Culture media, Morphology (Biology), Viability, Disease vectors, Ecology, Resistance (Biological), Rodents, Siphonaptera, USSR.

AD-640 295 **Field 6M**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
PROPERTIES OF ANTIBODIES FIXED ON PARTICLES AND PERSPECTIVES OF THEIR APPLICATION IN MICROBIOLOGY. REPORT V,
by A. K. Adamov. 6 Apr 66, 14p FTD-TT-65-1714
TT-66-62372
Unedited rough draft trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v41 n11 p3-7 1964. See also AD-639 795.

Descriptors: (*Antigens + antibodies, Synthesis), (*Antigen-antibody reactions, Microbiology), Immunology, Particles, Immune serums, USSR.

Conclusions: High sensitivity and specificity of suspension antibodies are due to structural characteristics of antibody-particle complexes, combining properties of particles and immune antibodies. Suspension antibodies are suitable for studying qualities of antigens and for identification of certain types of pathogeneous microbes (exciters of pestilence, botulism and others), which do not submit to identification with the aid of molecular antibodies. The use of suspension antibodies opens broad possibilities for a deeper investigation of antigenous structure microbes. (Author)

AD-640 344 **Field 6M, 6E**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
PASTEURELLA PSEUDOTUBERCULOSIS INFORMATION AS BACKGROUND FOR UNDERSTANDING PLAGUE,
by Michael J. Surgalla. 1965, 4p
Availability: Published in Public Health Reports v80 n9 p825-8 Sep 1965.

Descriptors: (*Pasteurella, Diseases), (*Pasteurella pseudotuberculosis, Humans), Pasteurella pestis, Immunity, Antigens + antibodies, Plasmin, Peptide hydrolases, Dissociation, Mutations.

Identifiers: Pesticins.

Information on the occurrence of Pasteurella pseudotuberculosis in man and animals of North America is needed as background for understanding the problem of plague. P. pseudotuberculosis, which can cause human infections with symptoms of appendicitis, is so closely related to the plague bacillus that a real understanding of one disease will have to include an understanding of the other. Support for this view is derived from information on the immunological relationship between P. pseudotuberculosis and Pasteurella pestis, their antigenic similarity, the pesticin-fibrinolysin-coagulase activities of P. pestis, the dissociation of P. pestis in the direction of P. pseudotuberculosis, and the reversible alteration of P. pseudotuberculosis characters in the direction of P. pestis. A small effort added to standard procedures by persons not concerned primarily with research could yield the needed information. (Author)

AD-640 351 **Field 6M**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
RAPID QUANTITATIVE SEROLOGICAL ASSAY OF STAPHYLOCOCCAL ENTEROTOXIN B,
by Francis J. Weirether, Evelyn E. Lewis, Albert J. Rosenwald, and Ralph E. Lincoln. 4 Nov 65, 9p
Availability: Published in Applied Microbiology v14 n2 p284-91 Mar 1966.

Descriptors: (*Staphylococcus aureus, Toxins + antitoxins), (*Toxins + antitoxins, Quantitative analysis), Serodiagnosis, Immune serums, Culture media.

A simple, rapid method, based on the Oudin single diffusion technique, is described for the quantitative assay of staphylococcal enterotoxin B. The method yields reproducible results without close control of such assay variables as temperature, antiserum dilution, and assay time, provided that the ionic strength is maintained above 0.2 N sodium chloride equivalent. (Author)

AD-640 352 **Field 6M, 6C**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
SUSCEPTIBILITY OF WHITE CARNEAU PIGEONS TO RESPIRATORY INFECTION BY VENEZUELAN EQUINE ENCEPHALITIS VIRUS,
by William S. Miller. 21 Apr 65, 6p
Availability: Published in American Journal of Epidemiology v83 n1 p48-53 1965.

Descriptors: (*Venezuelan equine encephalomyelitis virus, *Pigeons), Respiratory diseases, Dosage, Immunity, Antigens + antibodies, Serodiagnosis, Aerosols.

White Carneau pigeons were found to be susceptible to respiratory infection by Venezuelan equine encephalitis virus. With doses as low as 374 mouse intracerebral LD50 units inhaled, 7 of 8 birds exhibited viremias that approached 100,000 MICLD50 units per ml of blood. Viremias generally persisted through the third day after exposure. Birds were not obviously ill and showed serologic evidence of immunizing infections. (Author)

AD-640 353 **Field 6M**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
FACTORS AFFECTING TRANSFORMATION OF BACILLUS LICHENIFORMIS,
by Curtis B. Thorne, and Harold B. Stull. 15 Nov 65, 10p
Availability: Published in Journal of Bacteriology v91 n3 p1012-20 Mar 1966.

Descriptors: (*Bacillus, *Mutations), Growth, Culture media, Desoxyribonucleic acids, Nutrition.

Identifiers: Bacillus licheniformis.

Transformation systems involving two types of transformable mutants of Bacillus licheniformis 9945A were compared. Each system required its specific growth medium, but a single transformation medium could be used for both. Cells from a culture of optimal age were not competent, at least to any great extent, but they developed competence during incubation in a transformation medium. With each system, 3 to 5% of the recipient cells were transformed upon exposure to wild-type deoxyribonucleic acid (DNA) for 2 to 3 hr. When competent cells were exposed to DNA for 30 min, 1 to 2% of them were transformed. The data are interpreted to mean that cells were heterogeneous with respect to development of competence, and when properly grown cells were incubated in transformation medium some of them gained competence, whereas others lost it. If DNA was present during the entire period, the cells were transformed as they became competent and the transformants accumulated. However, during any short period of exposure to DNA, only those cells that were competent at the time were potential transformants. The high frequencies of transformation obtained in these studies made it feasible to prepare marked strains by transforming markers into recipient cells. These experiments demonstrated that the characteristics of the two transformation systems could not be attributed to specific nutritional markers. Presumably, each of the two series of highly transformable auxotrophic mutants also carried at least one other mutation that resulted in development of competence under the specific conditions. (Author)

AD-640 354 **Field 6M**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
FLUORESCENT CELL-COUNTING ASSAY OF YELLOW FEVER VIRUS,
by Nicholas Hahon. 13 Aug 65, 8p
Availability: Published in Journal of Infectious Diseases v116 p33-40 Feb 1966.

Descriptors: (*Yellow fever virus, *Fluorescent antibody techniques), Tissue culture, Quantitative analysis, Counting methods, Antigens, + antibodies, Immune serums.

A quantitative assay of infective yellow fever virus particles was developed that is based on the enumeration of cells containing fluorescent viral antigen 24 hours after infection of coverslip McCoy cell cultures. The rapidity and efficiency of virus adsorption onto cell monolayers was markedly enhanced by centrifugation of virus inoculum. By this procedure 95% of virus was adsorbed within 15 minutes, and a proportionality was demonstrated between the number of fluorescent cells and the volume of inoculum. The incubation period of 24 hours was established from observations on

the sequential development of viral antigen within cells and fluorescent cell counts. The relationship between virus concentration and cell-infecting units of virus was linear; the distribution of fluorescent cells in cell monolayers was random. The sensitivity of the fluorescent cell-counting assay was comparable to that of the method of intracerebral inoculation of mice. A quantitative linear relationship was demonstrated between the quantity of virus neutralized and the dilutions of antiserum. (Author)

AD-640 355 **Field 6M**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
FORMATION OF HEMOLYSIN BY STRAINS OF PSEUDOMONAS AERUGINOSA,
by Robert A. Altenbern. 12 Jul 65, 11p
Availability: Published in Canadian Journal of Microbiology v12 p231-41 1966.

Descriptors: (*Pseudomonas aeroginosa, Bacterial extracts), Culture media, Enzymes, Biosynthesis.

Identifiers: Hemolysin.

Hemolysin is formed in sonic extracts of cells of Pseudomonas aeruginosa by the action of a heat-labile substance, probably an intracellular 'release' enzyme, on a substrate from the disrupted cell. The substrate and most of the hemolysin released can be sedimented by high-speed centrifugation. Hemolysin-negative strains appear to possess no release enzyme but do contain the substrate since addition of particulate matter to extracts of hemolysin-positive cells increases the rate and extent of hemolysin formation. The rate of hemolysin release in sonic extracts is strongly influenced by the concentration of the two reactants, and minor dilution abolishes all activity. There is only a small amount of release enzyme and substrate present in 24-h cells but increasingly greater amounts appear in extracts of 48- and 72-h cells. The hemolysin-forming system is sensitive to heat and is inactivated in 2 min at 100 degrees. Treatment of particulate matter with lysozyme plus EDTA does not reduce the amount of hemolysin released by subsequent exposure of the particles to the release enzyme present in fresh sonic extract. (Author)

AD-640 357 **Field 6M, 6E**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
IMMUNOLOGIC STUDIES OF ANTHRAX. IV. EVALUATION OF THE IMMUNOGENICITY OF THREE COMPONENTS OF ANTHRAX TOXIN,
by B. G. Mahlandt, F. Klein, R. E. Lincoln, B. W. Haines, and W. J. Jones Jr. 2 Aug 65, 7p
Availability: Published in The Journal of Immunology v96 n4 p727-33 1966.

Descriptors: (*Bacillus anthracis, Toxins + antitoxins), (*Immunity, Bacillus anthracis), Antigens + antibodies, Spores, Resistance (Biological), Blood, Dosage, Rats, Guinea pigs.

Three components of anthrax toxin (edema factor, protective antigen and lethal factor) were separated and tested singly at three dose levels and in factorial combination (27 treatments) to determine their efficacy as immunogens in a resistant host (rat) and in a susceptible host (guinea pig). Each treatment was evaluated as an immunogen by five criteria: (1) protection of the host against challenge, (2) influence on the number of bacilli/milliliter of blood at death, (3) change in the units of toxin/milliliter of blood at death, (4) a development of antibody titer (Ouchterlony) and (5) units of toxin neutralized/milliliter of blood. These evaluations showed that (1) the LF component was highly immunogenic in rats against either toxin or spore challenge and in guinea pigs against spore challenge; (2) the PA component was immunogenic against spore challenge in rats and guinea pigs, but completely ineffective against toxin challenge in rats; (3) the EF component alone was nonimmunogenic; (4) the effects of LF and PA were additive and (5) EF added to LF, PA or LF-PA combinations interacted significantly with LF to increase resistance in the rat, but was not additive in resistance in the guinea pig. The number of organisms/milliliter of terminal blood decreased as resistance to establishment of disease increased. The units of toxin/milliliter of terminal blood were closely related to the number of bacilli/milliliter of blood at death. Only 17% of the prechallenge serum of guinea pigs, principally among the LF treatments, produced antigen antibody precipitin lines on Ouchterlony plates. (Author)

AD-640 359 **Field 6M, 6T**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
TOXICITY OF COPPER AND ASCORBIC ACID TO SERRATIA MARCESCENS,
by Leonard Zimmerman. 3 Dec 65, 6p
Availability: Published in Journal of Bacteriology v91 n4 p1537-42 Apr 1966.

Descriptors: (*Serratia marcescens, Germicides), (*Ascorbic acid, Toxicity), (*Copper, Toxicity), Chelate compounds, Chemical precipitation, Viability.

Neutral solutions of ascorbic acid were antibacterial to Serratia marcescens at low but not at high population densities. The toxicity of ascorbate was eliminated by metal-sequestering treatments, and was restored only by the addition of trace amounts of copper salts. Copper-ascorbate was equally toxic under aerobic or anaerobic conditions; its toxicity was abolished by (1) chelating agents that sequestered the copper, (2) metal-complexing agents that bound to the cells but did not sequester copper, and (3) iron salts in the presence of air. On the basis of these observations, the toxic effects of copper-ascorbate were attributed to its reaction with vital Fe-containing cellular components. (Author)

AD-640 360 **Field 6M**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
PASTEURELLA PESTIS: GROWTH TEMPERATURE, VIRULENCE, AND THE GRADED RESPONSE,
by Albert J. Rosenwald, and Ralph E. Lincoln. 22 Nov 65, 3p
Availability: Published in Journal of Bacteriology v91 n5 p1693-5 May 1966.

Descriptors: (*Pasteurella pestis, Viability), Culture media, Growth, Temperature, Dosage, Biological assay.

A comparison of the virulence of Pasteurella pestis was made by the graded and quantal response methods. Both tests reflected the difference in virulence of cultures grown at three temperatures. Cultures grown at lower temperatures gave the most variable response in virulence tests, and cultures grown at higher temperatures were more virulent. Results from the graded response test were obtained more quickly and more economically than those from the quantal response test. (Author)

AD-640 363 **Field 6M**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
ROLE OF THE LYMPHATICS IN THE PATHOGENESIS OF ANTHRAX,
by R. E. Lincoln, D. R. Hodges, F. Klein, B. G. Mahlandt, and W. J. Jones Jr. 5 Apr 65, 14p
Availability: Published in The Journal of Infectious Diseases v115 p481-94 Dec 1965.

Descriptors: (*Bacillus anthracis, *Lymphatic system), Diagnosis, Surgical techniques, Bacteria, Toxins + antitoxins, Blood, Cannulation, Lymph, Diseases.

Early identification of anthrax infection was attempted by means of a surgical technique allowing cannulation of both the lymphatic and blood systems in the rhesus monkey. This technique permitted observation and quantitation of organisms in the lymphatics and blood stream at any given time during the infection without disturbing the animal. Anthrax was established while the right and thoracic lymph was drained from the animal, indicating that there was a significant exchange of bacilli directly from the lymphatics to the blood. Once the regional lymph nodes draining the region of challenge became infected there was little or no difference in the dynamics of infection. Anthrax was not established following gastrointestinal challenge of 8 monkeys. An average of 80 million bacilli were generated in the infected lymphatics and poured into the blood over an 8-hour period before a septicemia occurred. The concentration of organisms in the lymph was on the average equal to or greater than the concentration of bacilli in the blood. Growth in the lymph appeared independent of route of challenge. Extravascular circulation (i.e., from blood to lymph) of anthrax bacilli appears not to occur. (Author)

AD-640 364 **Field 6M**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
BIOCHEMICAL STUDIES OF METABOLIC RELATIONSHIPS IN TULAREMIA,
by John P. Bowden. 21 May 65, 8p
Availability: Published in Journal of Infectious Diseases v115 p473-80 Dec 1965.

Descriptors: (*Pasteurella tularensis, *Metabolism), (*Infectious diseases, Oxygen consumption), Lymphatic system, Tissues (Biology), Culture media, Amino acids, Coenzymes, Guinea pigs, Rats.

Incubation of guinea pig lymph node slices with Pasteurella tularensis organisms in a synthetic medium lowered the respiration rate of the lymph node tissue. Comparison of the amino acid requirements of guinea pig lymph node slices with those of rat lymph node tissue showed that the guinea pig tissue has much higher qualitative and quantitative requirements for exogenous amino acids than that of the rat. The lowering of the tissue respiration rate under conditions in vitro resembling infection in vivo was shown experimentally to be the result of a deficiency of cysteine and glutamine. 2 compounds which are removed from the medium in appreciable quantities by P. tularensis. Studies with C14-labeled glutamine and cystine showed that glutamine is in large measure metabolized by the tissue but that cysteine or cystine are for the most part unchanged. However, this does not rule out the possibility that small amounts of some compound closely associated with respiration are synthesized from cysteine. Evidence that coenzyme A might be the compound in question was presented by experimental data that show that coenzyme A has the same effect as cysteine in maintaining a high rate of oxygen uptake of tissue homogenates. (Author)

AD-640 365 **Field 6M**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
CONCURRENT CHANGES IN TRANSDUCING EFFICIENCY AND CONTENT OF TRANSFORMING DEOXYRIBONUCLEIC ACID IN BACILLUS SUBTILIS BACTERIOPHAGE SP-10,
by Martha J. Taylor, and Curtis B. Thorne. 30 Aug 65, 8p
Availability: Published in Journal of Bacteriology v91 n1 p81-8 Jan 1966.

Descriptors: (*Bacillus subtilis, Genetics), (*Genetics, *Bacteriophages), Spores, Desoxyribonucleic acids, Culture media.

Identifiers: Transduction (Physiology).

Spores of Bacillus subtilis W-23-Sr infected with transducing phage SP-10 served as convenient inocula for broth cultures from which transducing phage was harvested. Methods are described for producing highly infected spores. The inoculum

level of infected spores in nutrient broth-yeast extract-glucose medium affected the transducing efficiency of SP-10 in lysates of these cultures. Phage in lysates of cultures inoculated with about 100,000 or fewer spores per milliliter transduced 20- to 350-fold more efficiently than did phage in lysates from cultures inoculated with 1 to 10 million spores per milliliter. Transduction frequencies in the order of .00001 per plaque-forming unit were obtained routinely, and some infected-spore preparations yielded phage that gave frequencies as high as .0001. The combination of inoculum level and incubation time required to produce the best transducing phage had to be determined empirically for each batch of infected spores. Several possible explanations for the difference between lysates having high (HTE) and those having low (LTE) transducing efficiency were ruled out by special experiments. The hypothesis is presented that some cultural condition resulting from a relatively low inoculum of phage-infected spores favors the incorporation by phage particles of bacterial deoxyribonucleic acid (DNA) in the manner required for the production of transducing phage. Support for this hypothesis is a demonstration, through transformation experiments with DNA extracted from HTE and LTE phage particles, that populations of HTE phage particles yielded significantly more (7 to 27 times) transforming activity per microgram of DNA than did populations of LTE phage. (Author)

AD-640 366 **Field 6M**
Not available from CFSTI.
Army Biological Center, Frederick, Md.
INTERSPECIES TRANSFORMATION BETWEEN BACILLUS SUBTILIS AND BACILLUS LICHENIFORMIS,
by Irvan D. Goldberg, Darrel D. Gwinn, and Curtis B. Thorne. 15 Apr 66, 6p
Availability: Published in Biochemical and Biophysical Research Communications v23 n4 p543-8 1966.

Descriptors: (*Bacillus, Genetics), Streptomycins, Resistance (Biological), Desoxyribonucleic acids.

Identifiers: Bacillus licheniformis.

AD-640 367 **Field 6M**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
REFRACTION AND ABSORPTION OF LIGHT IN BACTERIAL SUSPENSIONS,
by J. B. Bateman, Jack Wagman, and E. L. Carstensen. 31 May 65, 16p
Availability: Published in Kolloid-Zeitschrift Zeitschrift fuer Polymere v208 n1 p44-58 1966.

Descriptors: (*Bacteria, *Colloids), Refractive index, Absorption spectrum, Cells (Biology), Proteins, Nucleic acids, Test methods.

The apparent average refractive indices of three types of microorganism in liquid suspension have been estimated by two methods. In the first, the refractive index of the aqueous suspension is measured in an interferometer, the bacterial cell volume fraction is estimated from the dilution of an added inert solute, and the refractive index of the disperse phase is calculated with the aid of a mixture rule. The preliminary results obtained by the two methods are in satisfactory agreement and are consistent with the specific refractive increments of protein and nucleic acid and their concentrations in the cell. It is pointed out that measurements of optical density spectra can also give useful information concerning the number and size of cells in a suspension and their optical dispersion constants. Finally, the apparent spectral absorption of 'clarified' cell suspensions is presented and compared with spectra obtained by other methods. It is pointed out that because of refractive heterodispersity even 'clarified' suspensions are turbid, so that this method does not provide a completely satisfactory technique for cell spectrophotometry. (Author)

N66-27488 **Field 6M**
CFSTI Prices HC$5.00 MF$1.00
Republic Aviation Corp., Farmingdale, N. Y.
STUDY OF THE NORMAL FECAL BACTERIAL FLORA OF MAN.
by L. S. Gall. Jun 66, 170p NASA-CR-467
Contract NASW-738

Descriptors: *Feces, *Human waste, *Microbiology, Anaerobe, Bacteria, Culture, Digestion, Flora, Human, Metabolism, Morphology, Physiology, Space flight, Vitamin, Waste.

For abstract, see S 04 15.

N66-27536 **Field 6M**
CFSTI Prices HC$2.00 MF$0.50
Exotech, Inc., Alexandria, Va.
A STOCHASTIC STERILIZATION MODEL.
by S. Schalkowsky, and R. Wiederkehr. 6 May 66, 26p NASA-CR-75383, TR-13
Contract NASW-1340

Descriptors: *Mathematical model, *Sterilization, *Stochastic process, Contamination, Extrapolation, Heat, Mathematics, Microbe, Microorganism, Model, Probability, Process, Resistance, Sterility, Stochastic, Survival.

For abstract, see S 04 15.

N66-27754 **Field 6M**
CFSTI Prices HC$1.00 MF$0.50
Pennsylvania State Univ., University Park. Dept. Of Biophysics.
SUPPRESSION OF NONSENSE BY REVERTANT BACTERIA.
by F. Funk, M. Osborn, S. Person, and S. Phillips. 1965, 11p NASA-CR-75489
Grant NSG-324, Contract NSF GB-4485

Descriptors: *Bacteria, *Genetic code, *Mutation, *Radiation effect, Arginine, Bacteriophage, Cell, Code, Culture (biol), Decay, Effect, Genetics, Ionizing, Radiation, Reversal, Ultraviolet, Uracil.

For abstract, see S 04 15.

N66-28367 **Field 6M**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
THE INFLUENCE OF LOW TEMPERATURE ON MICROORGANISMS. PART II. THE INFLUENCE OF LOW TEMPERATURE ON THE DEVELOPMENT OF MOLDS.
by Z. Z. Bocharova, and F. M. Chistyakov. May 66, 33p NASA-TT-F-10144
Transl. Into English From Mikrobiologiya (Moscow), V. 6, No. 9-10, 1937 P 1293-1309

Descriptors: *Biology, *Low temperature environment, *Mold, Environment, Food, Growth, Low temperature, Microorganism, Spore, Storage, Viability.

For abstract, see S 04 15.

N66-28455 **Field 6M**
CFSTI Prices HC$1.00 MF$0.50
Public Health Service, Washington, D. C. Biophysics Section.
REDUCTION OF MICROBIAL DISSEMINATION, GERMICIDAL ACTIVITY OF ETHYLENE OXIDE, REDUCTION OF MICROBIAL CONTAMINATION ON SURFACES, EVALUATION OF LEAKAGE OF MICROBIAL CONTAMINATION FROM SPACE SUITS QUARTERLY SUMMARY REPORT NO. 7.
May 66, 15p NASA-CR-75733
NASA ORDER R-137

Descriptors: *Bacteriology, *Contamination, *Microorganism, *Space suit, Chamber, Dynamic, Human, Leakage, Microbe, Planetary, Shedding, Space, Static, Suit, Technique, Test.

For abstract, see S 04 16.

N66-28524 **Field 6M**
CFSTI Prices HC$2.00 MF$0.50
Public Health Service, Phoenix, Ariz. Technology Branch.
RECOVERY OF VIABLE MICROORGANISMS FROM SOLIDS. I - MODEL SYSTEMS.
by M. S. Favero, G. S. Oxborrow, N. J. Petersen, and J. R. Puleo. 8 Jun 66, 28p NASA-CR-75693
NASA ORDER R-137
Its Rept.-13

Descriptors: *Microorganism, *Solidification, *Spacecraft sterilization, Acid, Edta, Entrapment, Ethylenediaminetetraacetate, Ethylenediaminetetraacetic acid (edta), Hardware, Mortar, Paraplast, Pellet, Process, Pulverized, Space, Spacecraft, Spore, Sterilization, Storage, Viability.

For abstract, see S 04 16.

N66-28765 **Field 6M**
CFSTI Prices HC$1.00 MF$0.50
Syracuse Univ., N. Y. Biological Research Labs.
STUDIES ON TRACE ELEMENTS IN THE SPORULATION OF BACTERIA AND THE GERMINATION OF BACTERIAL SPORES INFORMAL SEMIANNUAL REPORT, 1 JAN. - 31 MAY 1966.
by R. A. Slepecky. 1966, 8p NASA-CR-75764
Grant NSG-693

Descriptors: *Germination, *Spore, *Trace element, Asynchronous, Bacillus, Bacteria, Bacteriology, Element, Growth, Manganese, Mutation, Purification, Synchronous, System, Temperature, Trace.

For abstract, see S 04 16.

N66-29724 **Field 6M**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
INFLUENCE OF LOW TEMPERATURES ON THE DEVELOPMENT OF MICROORGANISMS. III - INFLUENCE OF LOW TEMPERATURES ON THE DEVELOPMENT OF BACTERIA AND YEASTS.
Vliyaniye Nizkikh Temperatur Na Razvitiye Mikroorganizmov. Iii - Vliyaniye Nizkikh Temperatur Na Razvitiye Bakteriy I Drozhzhey
by F. M. Chistyakov, and G. L. Noskova. May 66, 23p NASA-TT-F-10142
Transl. Into English From Mikrobiologiya (Moscow), V. 7, No. 5, 1938 P 565-578

Descriptors: *Bacteria, *Cold tolerance (biol), *Low temperature environment, *Microbiology, *Yeast, Biology, Cold, Development, Effect, Environment, Low temperature, Microorganism, Tolerance.

For abstract, see S 04 16.

N66-36058 **Field 6M**
CFSTI Prices HC$1.00 MF$0.50
Florida State Univ., Tallahassee. Dept. Of Statistics.
BIOSTATISTICS OF SPACE EXPLORATION - MICROBIOLOGY AND STERILIZATION.
by R. G. Cornell. 24 Aug 66, 15p NASA-CR-77803
Contract NGR-10-004-029

Descriptors: *Contamination, *Microbiology, *Probability distribution, *Spacecraft sterilization, *Statistical analysis, Analysis, Assay, Component, Distribution, Model, Probability, Spacecraft, Statistical, Sterilization.

For abstract, see S 04 21.

AD-639 793 **See Field 6E**

AD-639 851 **See Field 6A**

AD-640 035 See Field 6E

AD-640 036 See Field 6C

AD-640 037 See Field 6E

AD-640 045 See Field 6E

AD-640 048 See Field 6E

AD-640 049 See Field 6O

AD-640 362 See Field 6E

AD-640 500 See Field 6R

AD-640 528 See Field 6O

6N. PERSONNEL SELECTION AND MAINTENANCE (MEDICAL)

AD-639 630 Field 6N, 5I, 5J
CFSTI Prices: HC$5.60 MF$0.50
Naval Medical Research Lab., New London, Conn.
A STUDY OF THE INTERRELATIONSHIPS OF PSYCHOLOGICAL AND PHYSIOLOGICAL MEASURES ON SUBMARINE ENLISTED CANDIDATES: I. HISTORY, EXPERIMENTAL DESIGN, AND STATISTICAL TREATMENT OF DATA,
by Ellsworth B. Cook, and Robert J. Wherry. 9 Mar 49, 56p MRL-142
NAVMED-NM-003-017-1
Prepared in cooperation with Ohio State Univ., Columbus.

Descriptors: (*Submarine personnel, Selection), Physical fitness, Medical examination, Psychiatry, Psychometrics, Projective techniques, Stress (Physiology), Stress (Psychology), Anthropometry, Blood counts, Visual acuity, Color vision, Pitch discrimination, Audiometry, Personality, Factor analysis.

Some 330 physiological and psychological measures were obtained on a population of 120 submarine enlisted candidates. The purpose and background of the main problem (that of making the submarine selection program more objective) is presented, and current screening measures are discussed together with additional indices included for purposes of comparison. The 330 measurements were subdivided into logical subject matter fields and factor analyzed. Areas covered included physical fitness tests, urinary 17-ketosteroid and androgen output and stress tolerance, psychiatric interview, Rorschach, physical characteristics, anthropometric and somatotyping data, blood data and psychological tests. This paper is designed to facilitate reading of later reports in the series, and to this purpose, a detailed discussion of the nature of the correlation coefficient and the technique of factor analysis is included in the appendix material.

AD-639 635 Field 6N, 6L
CFSTI Prices: HC$1.60 MF$0.50
Naval Medical Research Lab., New London, Conn.
ANALYSIS OF COLORS USED IN DVORINE COLOR PERCEPTION TESTING CHARTS.
Memorandum rept.
28 Aug 52, 11p MR-52-9
NAVMED-NM-003-041.10

Descriptors: (*Color vision, Test equipment), Medical examination, Graphics.

AD-640 164 Field 6N
CFSTI Prices: HC$1.00 MF$0.50
Naval Submarine Medical Center, Groton, Conn. Medical Research Lab.
VISUAL REQUIREMENT FAILURE BY CANDIDATES REPORTING FOR BASIC SUBMARINE TRAINING DURING 1963.
Memorandum rept.,
by Paul R. Kent. 6 May 64, 10p MR-64-2
NAVMED-MR005.14-2001-3.4

Descriptors: (*Visual acuity, *Submarine personnel), Medical examination, Selection, Vision, Standards, Military training.

The reasons for the failure of submarine candidates to pass the visual test upon reporting for basic submarine training were investigated. It was found that approximately two-thirds of the visual failures resulted, apparently, from improper screening at the preliminary examining facility. About one-third of the total failures were waiverable under current waiver policy. It is felt that the present visual standard may be over emphasizing monocular acuity at the expense of binocular acuity. (Author)

AD-640 166 Field 6N, 6E
CFSTI Prices: HC$1.00 MF$0.50
Naval Submarine Medical Center, Groton, Conn. Medical Research Lab.
ORAL HEALTH PROBLEMS OF SUBMARINE PERSONNEL AND SUGGESTED PROGRAMS FOR THEIR MANAGEMENT.
Memorandum rept.,
by Arne G. Nielsen. 10 Dec 63, 13p MR-63-14
NAVMED-MR005.12-5220-1.03

Descriptors: (*Dentistry, *Submarine personnel), Dental personnel, Teeth, Diseases, Mouth, Diagnosis.

A review of the past and present oral problems of submarine personnel is presented. The reported problems aboard FBM submarines indicated a need for an improved program to provide adequate underway dental care during the extended FBM patrol periods characteristic of this type of submarine, and a suggested program has been presented to meet this need. (Author)

N66-27954 Field 6N
CFSTI Prices HC$1.00 MF$0.50
Naval School Of Aviation Medicine, Pensacola, Fla.
THOUSAND AVIATOR STUDY - NONVESTIBULAR CONTRIBUTIONS TO POSTURAL EQUILIBRIUM FUNCTIONS.
by A. R. Fregly, A. Graybiel, R. E. Mitchell, and A. Oberman. 17 Mar 66, 19p NASA-CR-75520, NAMI-956
NASA ORDER R-136

Descriptors: *Gerontology, *Pilot selection, *Posture, *Psychomotor performance, Apparatus, Ataxia, Cardiology, Equilibrium, Neurology, Performance, Pilot, Prediction, Psychomotor, Psychophysiology, Quantity, Selection, Testing, Vestibular.

For abstract, see S 04 15.

AD-640 062 See Field 6K

6O. PHARMACOLOGY

AD-639 641 Field 6O, 6R, 6E
CFSTI Prices: HC$1.00 MF$0.50
Albert Einstein Medical Center, Philadelphia, Pa.
CHEMICAL PROTECTION AGAINST RADIATION DAMAGE TO AN IMMUNE RESPONSE IN MOUSE SPLEEN CELLS IN VITRO.
Rept. for 1 Sep 65-28 Feb 66,
by George Kollmann, Herman Friedman, and Bernard Shapiro. Aug 66, 13p
Contract AF 41 (609)-2637
Task 775703
SAM-TR-66-69

Descriptors: (*Radioprotective agents, *Immunity), Radiobiology, Spleen, Antigens + antibodies, Guanidines, Ascorbic acid, Gamma rays, Radiological dosage, Cells (Biology), Radiation effects, Mice.

Identifiers: Mercapto ethyl guanidine, Bis (quanidoethyl) disulfide.

Swiss Webster mice were sensitized by injection of sheep red blood cells and were sacrificed 4 days later. Suspensions of teased spleen cells were made and irradiated in the presence of MEG, GED, ascorbic acid, dehydroascorbic acid, or no agent. The cells were incubated after plating with agar, sheep red cells, dextran, and complement, and hemolytic plaques were counted. Plaques represent spleen cells which are still able to release antibody. Radiation reduced the number of plaques formed with a D37 of 8 to 16 kR. MEG, GED, and dehydroascorbic acid did not protect. Ascorbic acid showed good protection with D37 = 44, 33, 50 in three separate runs. The mechanism of this protection is under study. (Author)

AD-640 049 Field 6O, 6M
CFSTI Prices: HC$1.00 MF$0.50
Army Biological Labs., Frederick, Md.
THE INFLUENCE OF STREPTOMYCIN ON THE EFFECTIVENESS OF EXPERIMENTAL IMMUNIZATION WITH LIVE VACCINES. REPORT III. ADMINISTRATION OF STREPTOMYCIN FOLLOWING COMPLETION OF IMMUNIZATION WITH TULAREMIA VACCINE,
by D. T. Khokhlov. Jul 65, 3p Translation-1470
TT-66-62408
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v42 n3 p145-6 1965.
See also AD-618 865.

Descriptors: (*Streptomycins, Immunity), (*Pasteurella tularensis, Vaccines), (*Immunity, Pasteurella tularensis), Dosage, Effectiveness, Resistance (Biological), Guinea pigs, Mice, USSR.

Identifiers: Synergism.

An attempt was made to give an experimental foundation to the possibility of the associated application of emergency prophylaxis with streptomycin and tularemia vaccine. Materials presented in the present and previous reports testify to the possibility of such a combination when using average therapeutic doses of streptomycin. Such a combination may be advantageous when infection is with large doses of the tularemia microbe, and also in the event that the causative agent turns out to be resistant to streptomycin. (Author)

AD-640 528 Field 6O, 6M
CFSTI Prices: HC$1.10 MF$0.50
Army Biological Labs., Frederick, Md.
STUDIES OF THE IMMUNOGENIC PROPERTIES OF THE ALUMINUM HYDROXIDE VACCINE AGAINST ANTHRAX AND TESTING IT AT-LARGE IN THE PRACTICE,
by S. G. Kolksov, and N. A. Mikhailov. 1959, 10p ABL-trans-1295, Trans-V1398
TT-59-14670
Izuchenie Immunogennykh Svoistv Gidrookisaliuminievoi Vaktsiny Protiv Sibirskoi Iazvy i Ispytanie ee v Shiroloi Praktike, trans. of Gosudarstvennyy Nauchno-kontrolnyy Institut Veterinarnykh Preparatov. Trudy (USSR) 1956, v6 p250-55.

Descriptors: (*Bacillus anthracis, Vaccines), (*Aluminum compounds, Hydroxides), Laboratory animals, Guinea pigs, Rabbits, Animals, Mammals, Diseases, Epidemiology.

Identifiers: Aluminum hydroxide.

Conclusions: Testing the vaccine in crucial experiments, it was established that it possesses well-expressed immunegenic properties and produces in sheep immunity that lasts not less than for one year. The harmlessness of the vaccine was proved by tests on 655,659 agricultural animals of various raions of 2 krais and of 1 oblast'. It is considered expedient to recommend the application of the alu-

minum hydroxide vaccine against anthrax for prophylactic vaccinations of agricultural animals in wide productional experiments. (Author)

PB-170 917 **Field 6O, 6A**
CFSTI Prices: HC$2.60 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
STRUCTURE DES ANTIBIOTIQUES POLYSACCHARIDIQUES (Structure of polysaccharide Antibiotics),
by Luis Matutano. Jun 66, 27p CEA-R-2951
Text in French, summary in English.

Descriptors: (*Polysaccharides, Antibiotics), (*Antibiotics, Molecular structure), Glucosides, Chemical reactions, Solubility, Neomycins, Streptomycins, France.

Identifiers: Amicetins, Chalcomycins, Cinerubins, Kanamycins, Carbomycins, Erythromycins, Paromycins, Oleandomycins, Spiramycins.

A study was made of the structure of antibiotics having two or several sugars in their molecule. One may distinguish: (1) the polysaccharide antibiotics themselves, made up of two or several sugars either with or without nitrogen, such as streptomycins, neomycins, paromomycins, kanamycin, chalcomycin; (2) the heteropolysaccharide antibiotics made up of one saccharide part linked to an aglycone of various type through a glucoside: macrolide, pigment, pyrimidine purine. Amongst these latter are: erythromycin, magnamycin, spiromycin, oleandomycin, cinerubin and amicetin. The sugars can either play a direct role in biochemical reactions or act as a dissolving agent, as far as the anti-microbe power of these antibiotics is concerned. (Author)

AD-639 846 **See Field 6P**

AD-639 919 **See Field 20G**

AD-640 016 **See Field 15B**

6P. PHYSIOLOGY

AD-458 298 **Field 6P, 5J**
CFSTI Prices: HC$5.60
Langley Porter Neuropsychiatric Inst., San Francisco, Calif.
SOME EFFECTS OF RESPIRATORY AND CARDIAL CYCLES.
Summary progress rept.,
by Enoch Callaway. 20 Jan 65, 52p
Contract Nonr-2931 (00), Grant PHS-1GS-53

Descriptors: (*Cardiovascular system, *Psychophysiology), Motor reactions, Blood pressure, Respiration, Electrocardiography, Correlation techniques, Analysis of variance, Central nervous system, Heart, Electroencephalography, Electrophysiology.

The report deals with changes in the central nervous system function that can be related to phases of respiratory cycle and phases of the cardiac cycle. Primary emphasis is on voluntary motor function. The report consists of six sections. Section 1 demonstrates that involuntary acts do not occur with equal frequency throughout the cardiac cycle, although there is great individual variability. Young subjects with low blood pressure tend to institute fewest acts at the time of systole and more frequently institute acts midway through the cardiac cycle. Section 2 demonstrates that the form of the average vertex visual evoked response depends on phase both of respiratory and cardiac cycles. Section 3 similarly deals with electroencephalogram and demonstrates that EEG alpha waves are synchronized with the cardiac cycle. Section 4 shows that reaction time is fastest when stimuli are given at expiration. The discrepancy between this finding and other reports in the literature is discussed. Section 5 shows that the monosynaptic reflex response of the calf muscle produced by stimulating the tibial nerve (the H reflex response) is largest in inspiration in most subjects, although in one subject the reverse results were obtained at a statistically significant level. (Author)

AD-639 640 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
EXPERIMENTAL INVESTIGATIONS WITH ELECTRICAL STIMULATION OF THE OCULOMOTOR NUCLEUS: THE EFFECTS OF STIMULUS FREQUENCY.
Rept. for Sep 62-Jun 64,
by Donald G. Pitts. Jul 66, 17p SAM-TR-66-65
Task 775509

Descriptors: (*Eye, Electrophysiology), Vision, Adaptation (Physiology), Ophthalmology, Nervous system, Physiology, Infrared equipment, Test equipment, Thresholds (Physiology), Stimulation, Cats.

Identifiers: Oculomotor system, Optometers.

Procedures and methods for the study of the central control of accommodation by electrical stimulation are presented. Positive accommodation, an increase in the dioptric power of the eye, and negative accommodation, a decrease in the dioptric power of the eye, were found by brain-stem stimulation in the cat. The frequency threshold for positive accommodation was about 4 cps. The frequency threshold for negative accommodation was about 10 cps. Frequencies of 60 and 90 cps were more efficient in producing positive accommodation, while negative accommodation varied directly with the frequency up to the 120 cps limiting frequency. The central control of accommodation by the oculomotor nucleus appears to depend somewhat on the stimulus frequency. Not all responses can be explained by frequency alone, and a definitive theory must await further data and analysis. (Author)

AD-639 642 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
School of Aerospace Medicine, Brooks AFB, Tex.
EVALUATION OF AORTIC BLOOD VELOCITY COMPUTED FROM THE PRESSURE PULSE.
Rept. for Sep 63-Apr 66,
by John D. Boyett, Darwell E. Stowe, and Leroy H. Becker. Aug 66, 11p SAM-TR-66-75
Task 630207

Descriptors: (*Blood circulation, Velocity), (*Aorta, Blood circulation), Data processing systems, Analog computers, Blood pressure, Heart, Cannulation.

A method for computing aortic blood flow from the aortic pressure pulse by analog computer technics was evaluated. The method provides a continuous stroke-by-stroke indication of aortic blood flow through the use of a simple cardiac catheter. Aortic blood flow calculated from the area under the computed linear velocity curve was compared with cardiac output which was obtained by indicator dilution technics. Good correlation was found to exist between the two methods. (Author)

AD-639 670 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Arctic Aeromedical Lab., Fort Wainwright, Alaska.
OXYGEN CONSUMPTION AND BODY TEMPERATURES OF ESKIMOS DURING SLEEP.
Rept. for 17 Jun-3 Jul 63,
by Frederick A. Milan, and Eugene Evonuk. Jul 66, 22p AAL-TR-66-10
Proj. AF-8238
Task 823801

Descriptors: (*Sleep, Metabolism), (*Body temperature, Sleep), (*Oxygen consumption, Sleep), Adaptation (Physiology), Humans, Alaska.

Identifiers: Eskimos.

The paper reports the results of measurements of metabolism and body temperatures taken during 14 nights of comfortably warm sleep in six male Eskimos from the village of Wainwright on the arctic coast of Alaska. The mean age of these subjects was 20.8 (plus or minus 1.26) years, mean height 169.1 (plus or minus 5.08) cm, mean weight 66.6 (plus or minus 2.0) kg and mean value for percent body fat 9.1 (plus or minus 1.08)%. These data show the effects of the sleep cycle on metabolism and body temperature. The sleeping metabolic rate declined from 50 (plus or minus 7.35) kcal/sq m/hr at 2230 hours to 39 (plus or minus 5.22) kcal/sq m/hr at 0600 hours. Concomitantly, rectal temperature, which was negatively correlated with time (r = - .965393), fell from 37.0 (plus or minus .386) C at 2230 hours to 35.4 (plus or minus .386) C by 0600 hours. Calculated mean body temperature was directly related to the level of metabolic activity. These coastal Eskimos had essentially normal values for early morning basal metabolic rates in contrast to Anaktuvuk Pass Eskimos from the interior of Alaska who are hypermetabolic. (Author)

AD-639 682 **Field 6P**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
AUDITORY THRESHOLDS OF SHORT TONES AS A FUNCTION OF REPETITION RATES,
by W. R. Garner. 26 May 47, 10p
Contract N5ori-166 (01)
SPECDEVCEN-166-I-13
Availability: Published in The Journal of the Acoustical Society of America v19 n4 p600-8 Jul 1947.

Descriptors: (*Hearing, Thresholds (Physiology)), Auditory perception, Noise, Frequency.

Auditory thresholds were obtained for repeated short tones (sine-wave) with repetition rates between 1/4 and 100 per second, and tone durations between 1 and 50 milliseconds. Both noise-masked and quiet thresholds were measured. Although the total energy in a stimulus can be changed by varying either the repetition rate or the duration, the results show that only in the latter case is there an equivalent shift in the threshold. Discussion of the results in terms of spectral distribution of energy of such tones leads to the conclusion that the ear does not perform a Fourier analysis of these tones. Further discussion indicates the conditions necessary for temporal integration of acoustic energy by the ear. (Author)

AD-639 686 **Field 6P, 20A**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
THE EFFECT OF FREQUENCY SPECTRUM ON TEMPORAL INTEGRATION OF ENERGY IN THE EAR,
by W. R. Garner. 16 Jul 47, 8p
Contract N5ori-166 (01)
SPECDEVCEN-166-I-18
Availability: Published in Journal of the Acoustical Society of America v19 n5 p808-15 Sep 1947.

Descriptors: (*Hearing, Thresholds (Physiology)), (*Acoustic properties, Bandwidth), Frequency, Energy, Time, Intensity, Ear, Noise.

The experiments are designed to test the following hypothesis. The rate of the temporal integration of energy in the ear (at threshold) is dependent on the width of the frequency band of the energy to be integrated. Duration is exactly equivalent to intensity only when all the energy to be integrated is in a narrow band of frequencies. The hypothesis is tested by taking advantage of the spectral distribution of energy in short tones. As a tone becomes very short, the effective band width of the energy increases. The band width of energy is essentially

defined by the reciprocal of the duration of the tone. Thus as the duration of a tone decreases, not only does the total energy in that tone decrease, but the band width of energy also increases. The intensity threshold, then, has to be increased (as duration is decreased) to compensate for both effects if the hypothesis is correct. The results are in line with the predictions of the hypothesis. The width of the band necessary for maximum integration is also related to frequency and the width of critical bands. (Author)

AD-639 760 **Field 6P**

Not available from CFSTI.

Army Medical Research and Nutrition Lab., Denver, Colo.

COMPARISONS OF NITROGEN, CALCIUM AND IODINE EXCRETION IN ARM AND TOTAL BODY SWEAT,

by C. Frank Consolazio, Le Roy O. Matoush, Richard A. Nelson, Gerhard J. Isaac, and John E. Canham. 1966, 6p

Availability: Published in American Journal of Clinical Nutrition v18 n6 p443-8 Jun 1966.

Descriptors: (*Perspiration, Chemical analysis), Nitrogen, Calcium, Iodine, Excretion, Arms, Body, Humans.

Comparison of excretions of nitrogen, calcium and iodine, between arm and total body sweat, showed fairly good agreement. Calcium determined from total body sweat ranged from 71 to 76 per cent of that derived by extrapolation from arm sweat, the nitrogen value was 86 to 93 per cent. These values are in better agreement if one takes into account the approximate 7.5 per cent respiratory water loss, which has been included in the calculations of values obtained for total arm sweat. Correlation between the excretion in arm and total body sweat is excellent if all arm sweat samples weighing less than 16 gm. are eliminated. On the basis of these comparisons the calcium losses in sweat reported previously still remain high. These findings again reaffirm the presence of additional nitrogen, calcium and iodine losses in sweat that have been ignored in many balance studies. Previous calcium and nitrogen balance studies in which equilibrium apparently was attained should be re-evaluated, with consideration being given to these sweat losses, particularly in studies involving men living and working in high environmental temperatures. These sweat losses are probably of little practical significance in studies of fairly inactive subjects living on an air-conditioned ward or in a temperate environment. It is recommended that in future studies related to sweat collection, the total body sweat procedure should be utilized, wherever possible. (Author)

AD-639 763 **Field 6P**

Not available from CFSTI.

Army Medical Research and Nutrition Lab., Denver, Colo.

COPPER, MOLYBDENUM AND ZINC INTERRELATIONSHIPS: THE INFLUENCE OF INORGANIC SULFATE UPON DISTRIBUTION AND EXCRETION OF 65Zn AND 99Mo IN PREGNANT RATS,

by Kenneth E. Kinnamon. 6 Nov 65, 8p

Availability: Published in The Journal of Nutrition v80 n3 p365-72 Jul 1966.

Descriptors: (*Pregnancy, *Nutrition), (*Sulfates, Diet), (*Zinc, Diet), (*Molybdenum, Diet), Copper, Urine, Excretion, Embryos, Deficiency diseases, Labeled substances, Rats.

The effects of dietary sulfate, alone and in combination with dietary copper, molybdenum, and zinc, were studied in the pregnant rat with respect to distribution and excretion of administered 65Zn and 99Mo. Increased dietary sulfate alone or in combination with any of these 3 elements was found not to significantly affect: 99Mo or 65Zn retention in fetal tissues or placental membranes (amnion, chorion, yolk sac, allantois, and decidua); 99Mo digestive tract absorption or excretion via urine or feces; 99Mo blood levels; 65Zn excretion via urine or feces; or volume of urine excreted. Diets high in sulfate with copper and molybdenum added did affect urinary excretion of 99Mo. In rats of the latter group, urinary excretion of labeled molybdenum was significantly lower than in animals fed any other ration containing elevated levels of molybdenum. Animals fed high molydenum rations showed lower blood, fetal, and placental structure retention and higher urine excretion of labeled molybdenum after 48 hours. (Author)

AD-639 764 **Field 6P**

Not available from CFSTI.

Army Medical Research and Nutrition Lab., Denver, Colo. Physiology Div.

A THREE-DIMENSIONAL RECONSTRUCTION OF LUNG PARENCHYMA,

by Gerald P. Stelter, J. E. Hansen, and D. G. Fairchild. 3 Dec 65, 7p

Availability: Published in The American Review of Respiratory Diseases v94 n1 p79-85 Jul 1966.

Descriptors: (*Lungs, *Anatomical models), Respiratory system, Physiology, Anatomy, Dogs.

An exact reconstruction of a highly magnified small area of a normal dog lung was made to study a complete subgross unit and its spatial relations to adjacent units. The writers define a segment of the distal airways as a polyhedral conduit of gas without a major change in axial direction, the edges of which consist of epithelial-covered bundles of connective tissue, smooth muscle, elastic fibers or vessels. Its vertices are intersections of these bundles and its facets are defined by curving planes of gas, limited by the tissue edges of the facet. Alveoli are lateral or distal terminations and not further subdivided by septa of the airways. Their orifices are generally ovoid and their walls consist of uninterrupted tissue at the magnification used in the reconstruction. The branching pattern of the distal airway is polychotomous and not dichotomous. There is little change in the mean orifice diameter of succeeding generations of distal airways. The writers do not consider the terms 'alveolar ducts,' 'saccules,' and 'atria' to be necessary as they are of similar structure and have the same functional significance. The term 'distal airway' is used to replace these subdivisions. The geometric pattern of the entire subgross unit provides minimal traveling distance of gas from the conducting area of the lung to the maximal diffusing surface and minimizes the obstructing potential of intraluminal solid or liquid substances. The significance of the structure of the lung in relation to duct ectasia and pulmonary emphysema is discussed. (Author)

AD-639 812 **Field 6P**

Not available from CFSTI.

Siena Univ. (Italy). Istituto di Patologia Medica.

VARIAZIONI PRESSORIE DURANTE IL SONNO PROFONDO NEL GATTO CON DEAFFERENTAZIONE SENOCAROTICA E AORTICA,

by M. Guazzi, and A. Zanchetti. 1964, 4p

Grant AF-EOAR-41-64

AFOSR-66-1103

Text in Italian.

Availability: Published in Del Bollettino della Societa Italiana di Biologia Sperimentale v40 p2156-58.

Descriptors: (*Blood pressure, *Sleep), Arteries, Aorta, Cats, Italy.

AD-639 813 **Field 6P**

Not available from CFSTI.

Siena Univ. (Italy). Istituto di Patologia Medica.

A STUDY OF PONTINE LESIONS SUPPRESSING DEEP SLEEP IN THE CAT,

by G. Carli, and A. Zanchetti. 1965, 41p

Grant AF-EOAR-41-64

Proj. AF-9777

Task 977701

AFOSR-66-0846

Availability: Published in Arch. Ital. Biol. v103 p751-88 1965.

Descriptors: (*Sleep, Electroencephalography), Electrophysiology, Brain, Inhibition, Cats, Italy.

Experiments were performed on cats carrying implanted recording electrodes in the skull and neck, whose sleeping behavior was long studied both before and after lesions in the caudal midbrain and in the pons. Complete destruction of various structures in the caudal midbrain and in the pons did not prevent deep sleep from repeatedly occurring. Among these structures, which are clearly not essential for induction of deep sleep, one should recall several nuclei participating in the ascending limb of the midbrain-limbic circuit, several raphe nuclei, nucleus reticularis tegmenti pontis, the locus coeruleus as well as the associated nucleus subcoeruleus. None of these structures has also been found to play an essential role in mediating any of the ascending or descending phenomena of deep sleep. In none of the cats with loss of deep sleep was nucleus reticularis pontis caudalis markedley injured. Loss of deep sleep for at least four consecutive days, and often for longer periods, was constantly associated with lesions in nucleus reticularis pontis oralis. However, only when the largest extent of the brain stem lesion involved the mediolateral portions of the middle and perhaps the postepontis oralis has been devided, was deep sleep long suppressed in all its various manifestations. Lesions limited to either the medial or the lateral portions of nucleus reticularis pontis oralis at any rostrocaudal level, or even severely involving the anterior third but affecting to a lesser degree the middle one, were always compatible with maintenance of deep sleep. (Author)

AD-639 829 **Field 6P**

Not available from CFSTI.

Genoa Univ. (Italy). Clinica Neurochirurgica.

RELATIONS BETWEEN THRESHOLD OF AROUSAL AND ELECTROENCEPHALOGRAPHIC PATTERNS DURING SLEEP IN MAN,

by Mario Pisano, Guido Rosadini, Gian Franco Rossi, and Janco Zattoni. 28 Jul 65 6p

Grant AF-EOAR-4-65

Proj. AF-9777

Task 977701

AFOSR-66-0743

Availability: Published in Physiology and Behavior v1 p55-8 1966.

Descriptors: (*Sleep, *Electroencephalography), Pain, Thresholds (Physiology), Nystagmus, Cats, Humans, Italy.

Identifiers: Wakefulness.

The depth of sleep was evaluated in human subjects by studying the intensity of painful electric stimuli to the skin necessary to produce arousal (study of the threshold of arousal). The threshold of arousal was definitely lower during the phase 1 of sleep than during the other phases. No significant difference between sleep with slow electroencephalographic waves and sleep with fast, low amplitude electroencephalographic activity and rapid eye movements was found. In this respect there is striking difference from what occurs in the cat. (Author)

AD-639 830 **Field 6P**

Not available from CFSTI.

Genoa Univ. (Italy). Clinica Neurochirugica.

INDUCTION OF EEG DESYNCHRONIZED SLEEP BY ELECTRICAL STIMULATION OF THE NEOCORTEX,

by M. Di Paola, G. F. Rossi, and J. Zattoni. 1965, 18p

Grant AF-EOAR-4-65

Proj. AF-9777

Task 977701

AFOSR-66-1112

Availability: Published in Arch. Ital. Biol. v103 p818-31 1965.

Descriptors: (*Sleep, *Electroencephalography), Cerebral cortex, Stimulation, Electrophysiology, Cats, Italy.

The effects of cortical stimulation on the occurrence of episodes of EEG desynchronized sleep were studied in chronic experiments performed on free-moving cats. The following neocortical areas were explored: anterior and posterior sigmoid gyri, anterior and posterior lateral gyri, suprasylvian gyrus, anterior sylvian gyrus anterior ectosylvian gyrus. Arousal from sleep as well as induction on the EEG desynchronized phase of sleep were obtained following cortical stimulations performed during EEG synchronized sleep. The type of the response was dependent on the general conditions of the animal at the moment on the stimulation: (i) when the stimulation was performed at the beginning of sleep, arousal occurred; while (ii) when the cortical stimulus was applied during a well-developed EEG synchronized stage of sleep, an EEG desynchronized episode was obtained. The physical parameters of stimulation did not influence the type of the response. The EEG desynchronized sleep was obtained by all the cortical areas stimulated; the arousing effect by most, but not by all of them. These results might suggest, but do not prove, a phasic cortical participation in the mechanism underlying the onset of the EEG desynchronized phase of sleep. (Author)

AD-639 833 **Field 6P**

Not available from CFSTI.

Brussels Univ. (Belgium). Lab of Pathophysiology of the Nervous System.

LA NEUROPHYSIOLOGIE DE LA PERCEPTION SENSORIELLE (The Neurophysiology of Sensory Perception),

by J. E. Desmedt. 1965, 18p

Grant AF-EOAR-57-65

Proj. AF-9777

Task 977701

AFOSR-66-0747

Text in French.

Availability: Published in Bulletin de l'Academie Royale de Medecine de Belgique v5 ser7 n6-7 p461-75 1965.

Descriptors: (*Sensory perception, *Central nervous system), Physiology, Nervous system, Brain, Control, Belgium.

THE INFLUENCE OF HIGHER CNS centers on peripheral sensory perception is discussed. It is stated that 'sensory processing' begins at the start of the afferent pathways and is not the exclusive domain of higher centers. The processing of sensory messages in peripheral relay areas may be of a plastic nature which is dependent on centrifugal control. (Author)

AD-639 834 **Field 6P, 5J**

Not available from CFSTI.

Brussels Univ. (Belgium). Lab. of Pathophysiology of the Nervous System.

SUR LA RELATION ENTRE LE SEUIL DE PERCEPTION TACTILE ET LES POTENTIELS EVOQUES DE L'ECORCE CEREBRALE SOMATOSENSIBLE CHEZ L'HOMME (The Relationship Between the Tactile Perception Threshold and Evoked Potentials in the Somato-Sensory Cerebral Cortex of Man),

by Julien DeBecker, Jean Edouard Desmedt, and Jacqueline Manil. 4 Jan 65, 6p

Grant AF-EOAR-57-65

Proj. AF-9777

Task 977701

AFOSR-66-0741

Text in French.

Availability: Published in Comptes Rendes des Seances de l'Academie des Sciences v260 p687-9 Jan 11 1965.

Descriptors: (*Sensory perception, Thresholds (Physiology)), (*Cerebral cortex, Sensory perception), Touch, Stimulation, Psychometrics, Psychophysiology, Belgium.

Cerebral potentials evoked by electric shocks on the fingers of normal awake human subjects have been analyzed by a Mnemotron calculating machine. The psychometric curve illustrating the subject's percentage of detection of these stimuli has also been drawn. Under optimal technical conditions, a primary evoked potential which is well-localized on the scalp is obtained for only 10-50% of the stimuli which are perceived by the subject. The statistical psychophysical threshold may then be correlated with the cerebral electrical signal. (Author)

AD-639 843 **Field 6P**

Not available from CFSTI.

Siena Univ. (Italy). Istituto di Patologia Medica.

ROLE OF PRESSOCEPTIVE AND CHEMOCEPTIVE REFLEXES IN THE REGULATION OF CIRCULATION DURING SLEEP,

by M. Guazzi, G. Baccelli, and A. Zanchetti. 1965, 3p

Grant AF-EOAR-6-65

Proj. AF-9777

Task 977701

AFOSR-66-114

Availability: Published in Abstracts and Papers presented at International Congress of Physiological Sciences (23rd).

Descriptors: (*Sleep, *Blood pressure), (*Blood circulation, Sleep), Reflexes, Arteries, Nystagmus, Electroencephalography, Cats, Italy.

Identifiers: Electromyography.

In order to study the role of sino-aortic reflexes in circulatory control during such a usual daily phenomenon as sleep, the effects of deep sleep on arterial pressure was compared with intact sino-aortic reflexes and with sino-aortic deafferentation. In all cats tested, blood pressure was continuously recorded through a polyethylene cannula in a femoral artery, while EEG, neck EMG and eye movements were simultaneously monitored to assess depth of sleep. In cats with intact presso- and chemoceptive reflexes, episodes of deep sleep were accompanied by marked falls in both systolic and diastolic blood pressure. Much larger falls were observed in animals after bilateral sino-aortic deafferentation: such low pressure values can be attained in these animals during sleep, that sometimes episodes of transient cerebral ischemia (electroencephalographic flattening and generalized seizures) have been observed. Selective destruction of either carotid body chemoceptors or carotid sinus pressoceptive afferents has provided a means of assessing the respective role of each type of affenent imput in regulating circulation during deep sleep. (Author)

AD-639 845 **Field 6P, 7C**

Not available from CFSTI.

Georgetown Univ., Washington, D. C.

EFFECT OF DIMETHYL SULFOXIDE ON COOLING RATES OF UNRESTRAINED RATS,

by J. A. Panuska, T. I. Malinin, and R. J. Mentz. 4 Apr 66, 6p

Contract DA-49-193-MD-2668

Availability: Published in Cryobiology v2 n6 p345-50 1966.

Descriptors: (*Hypothermia, *Sulfoxides), Body temperature, Freezing, Organic sulfur compounds, Injection (Medicine), Cooling, Rats, Cold weather tests.

Identifiers: Cryobiology, Dimethyl sulfoxide.

A total of 170 adult rats were exposed to 1C, 15C, and 25C environments following ip injections of 3 to 6 g per kg of DMSO in saline. Shaved subjects receiving 3 g per kg of DMSO in a 1C environment cooled to a body temperature of 10C within 239 min; subjects receiving 6 g per kg of DMSO cooled to 10C in 175 min. Shaved saline controls required 412 min to reach the same temperatures. Unshaved rats in a 1C environment which were treated with 6 g per kg of DMSO cooled to 10C within 383 min. Unshaved saline controls failed to become hypothermic. Shaved subjects injected with 6 g per kg of DMSO in an environment of 15C gave a mixed response, a few maintaining normothermia, some cooling a few degrees and then rewarming and 50% cooling to environmental temperatures. All controls remained normothermic. At an environmental temperature of 25C, DMSO-treated animals dropped 3.6C and then rewarmed. Control subjects remained normothermic. Each DMSO-treated group, therefore, manifested a significant disturbance of temperature regulation. (Author)

AD-639 846 **Field 6P, 6O**

Not available from CFSTI.

North Carolina Univ., Chapel Hill. Dept. of Physiology.

VASODILATOR RESPONSE TO EPINEPHRINE IN SKELETAL MUSCLE,

by L. R. Yonce, J. W. McGee, J. F. Sanderson, and G. Beer. 1965, 1p

Contract DA-49-007-MD-1002, Grant N1H-HE-03757

Availability: Published in Federation Proceedings v24 n2 Mar-Apr 1965.

Descriptors: (*Epinephrine, *Cardiovascular system), (*Vasoactive agents, Epinephrine), Muscles, Heart, Arteries, Dosage, Blood pressure, Nervous system.

Injections of epinephrine into the jugular vein (dog) produced an initial vasodilatation in the gracilis muscle after ca. 5-20 sec. delay. At higher doses the vasodilatation was followed by vasoconstriction. The purpose of the experiments is to determine the cause of the initial vasodilatation. Acutely denervating the muscle generally decreased the amount of vasodilatation. If the muscle was perfused from a constant pressure pump, some vasodilatation persisted until the nerve was cut. Sectioning the vagi, denervating the carotid sinus, injecting DCI or administering pyribenzamine did not eliminate the vasodilatation. Arterial injections did not produce vasodilatation until the epinephrine had passed through the heart. Placing a delay in the arterial inflow did not change the time-course of the vasodilatation. Injection into coronary arteries produced the vasodilatation sooner than i.v. injections. Partially clamping the femoral artery to damp the pulse pressure and lower mean pressure effectively eliminated the vasodilatation in the denervated muscle. These data indicate that the vasodilatation is produced by some undetermined nervous mechanism and also by a physical mechanism related to the pulse pressure. (Author)

AD-639 847 **Field 6P**

Not available from CFSTI.

North Carolina Univ., Chapel Hill. School of Medicine.

OXYGEN CONSUMPTION AND VASCULAR RESISTANCE DURING HYPOTHERMIA IN SKELETAL MUSCLE,

by L. R. Yonce, J. F. Ervin, and J. R. Dykers Jr. 1965, 1p

Contract DA-49-007-MD-1002, Grant PHS-HE-03757

Availability: Published in Federation of Proceedings v22 n2 1p nd.

Descriptors: (*Oxygen consumption, *Hypothermia), (*Musculoskeletal system, Hypothermia), Blood vessels, Metabolism, Muscles.

A large amount of literature suggests that the vasomotor activity in skeletal muscle is related to the metabolism of the muscle tissue. Previous experiments from this laboratory have established that the rate of lowering the temperature of the isolated gracilis muscle of dogs determines whether vasoconstriction or vasodilatation occurs. The purpose of the present experiments was to determine if the oxygen consumption is also altered differently according to the rate of lowering the temperature. The data indicate no significant difference in the

magnitude of decrease in oxygen consumption when the temperature is lowered either slowly or rapidly. However, the decreased oxygen consumption during hypothermia is manifested primarily by a decreased blood flow when the temperature is lowered slowly and by a decreased AV oxygen difference when lowered rapidly. It is concluded that the aerobic metabolism during hypothermia as indicated by oxygen consumption is not necessarily related to the vascular activity in skeletal muscle. (Author)

AD-640 085 **Field 6P, 5J**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore.
EFFECT OF TARGET BRIGHTNESS ON 'NORMAL' AND 'SUBNORMAL' VISUAL ACUITY,
by James E. Kuntz, and Robert B. Sleight. 28 Oct 48, 10p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-I-67
Prepared in cooperation with Purdue Univ., Lafayette, Ind.
Availability: Published in Journal of Applied Psychology v33 n1 p83-91 Feb 1949.

Descriptors: (*Visual acuity, Brightness), Targets, Thresholds (Physiology).

An experiment was performed to determine whether the amount of increase in visual acuity, with increase of brightness on targets, differs markedly for persons with initial 'subnormal' acuity from those with initial 'normal' acuity. The experiment was of a threshold nature with subjects locating checkerboard targets under six levels of target brightness varying from 3.16 footlamberts to 1000 footlamberts. It was found that a subnormal group gained significantly more in visual acuity terms with an increase in target brightness than did a normal group. The data show that adequate light for seeing details is: (1) Between 10 and 30 footlamberts for those with normal vision; (2) Somewhere between 30 and 40 footlamberts for those with subnormal vision. (Author)

AD-640 131 **Field 6P, 5J**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md.
THE INFLUENCE OF FIGURE-GROUND RELATIONSHIPS IN BINOCULAR RIVALRY,
by Lawrence T. Alexander. 19 Feb 51, 6p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-I-127
Availability: Published in Journal of Experimental Psychology v41 n5 p376-81 May 1951.

Descriptors: (*Vision, Space perception), Geometric forms, Brightness, Retina, Visual perception, Tests.

Identifiers: Binocular vision.

An attempt was made to investigate the phenomenon of binocular rivalry in terms of figure-ground organization. The hypothesis tested was that 'strong' figures will alternate more rapidly than 'weak' figures when viewed stereoscopically. Five Ss viewed four stereograms which exemplified two different characteristics of figure strength. Two stereograms illustrated a broken versus a continuous contour; two, greater and less contrast between figure and ground. The data substantiate the hypothesis, and the results are discussed in terms of the Kohler-Wallach theory of cortical satiation and the Washburn theory that binocular rivalry is a necessary condition for the perception of depth. (Author)

AD-640 183 **Field 6P**
Not available from CFSTI.
Stanford Univ., Calif. Dept. of Biological Sciences.
THE MECHANISM OF DISCHARGE PATTERN FORMATION IN CRAYFISH INTERNEURONS,
by Kimihisa Takeda, and Donald Kennedy. 1 Jul 64, 22p
Grants AF-AFOSR-62-147, PHS-B-2944
Proj. AF-9777
Task 977701
AFOSR-66-1131
Availability: Published in Journal of General Physiology v48 n3 p435-53 Jan 1965.

Descriptors: (*Crustacea, Nerve cells), (*Nerve cells, Electrophysiology), Stimulation, Inhibition, Thresholds (Physiology), Nerve impulses, Physiology, Nervous system.

Excitatory and inhibitory processes which result in the generation of output impulses were analyzed in single crayfish interneurons by using intracellular recording and membrane polarizing techniques. Individual spikes which are initiated orthodromically in axon branches summate temporally and spatially to generate a main axon spike; temporally dispersed branch spikes often pace repetitive discharge of the main axon. Hyperpolarizing IPSP's sometimes suppress axonal discharge to most of these inputs, but in other cases may interact selectively with some of them. The IPSP's reverse their polarity at a hyperpolarized level of membrane potential; they sometimes exhibit two discrete time courses indicating two different input sources. Outward direct current at the main axon near branches causes repetitive discharges which may list, with optimal current intensities, for 1 to 15 seconds. The relation of discharge frequency to current intensity is linear for an early spike interval, but above 100 to 200 impulses/sec. it begins to show saturation. In one unit the current-frequency curve exhibited two linear portions, suggesting the presence of two spike-generating sites in the axon. Current threshold measurements, using test stimuli of different durations, showed that both accommodation and 'early' or 'residual' refractoriness contribute to the determination of discharge rate at different frequencies. (Author)

AD-640 193 **Field 6P**
CFSTI Prices: HC$5.00 MF$1.00
Army Inst. of Dental Research, Walter Reed Medical Center, Washington, D. C.
ANATOMY OF THE HEAD AND NECK: SYLLABUS,
by Thurlow W. Brand. 1955, 186p
Prepared in cooperation with Pittsburgh Univ., Pa. School of Dentistry.

Descriptors: (*Head, *Anatomy), Bone, Muscles, Tongue, Mouth, Throat, Nose, Paranasal sinuses, Cranial nerves, Arteries.

Contents: The skull as a whole; Osteology of the skull; The muscles of the head; Muscles of the neck region; The tongue; Soft palate; Nasal cavity; Cranial nerves; Arterial supply of head and neck.

AD-640 201 **Field 6P**
Not available from CFSTI.
Pittsburgh Univ., Pa. School of Dentistry.
AN ATLAS OF ANATOMY OF THE HEAD AND NECK.
by Thurlow W. Brand. 1955, 186p
Contents identical with AD-640 193.

Descriptors: (*Head, *Anatomy), Throat, Bone, Muscles, Tongue, Mouth, Paranasal sinuses, Nose, Cranial nerves, Arteries.

Contents: The Skull as a Whole; Osteology of the Skull; The Muscles of the Head; Muscles of the Neck Region; The Tongue; Soft Palate; Nasal Cavity; Cranial Nerves; Arterial Supply of Head and Neck.

AD-640 292 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
DUALITY IN THE FUNCTION OF THE PAROTID GLANDS IN HUMANS,
by A. I. Vasilyev. 21 Jun 66, 19p FTD-TT-65-1996
TT-66-62434
Unedited rough draft trans. of Fiziologicheskii Zhurnal SSSR v45 n1 p24-31 1959.

Descriptors: (*Salivary glands, Secretion), Physiology, Saliva, Stimulation, Mastication, USSR.

A special technique has been elaborated for keeping optical records of salivation in terms of calibrated integrating curves. Data was thus provided for comparing patterns of secretory activity as well as amounts of saliva secreted from right and left parotid salivary glands in human subjects in response to unilateral intraoral chemical stimulation. When the initial functional states of both glands were equal, a greater flow of saliva occured on the side of stimulation. If there were a marked functional asymmetry of salivation, the flow of saliva from the unstimulated, but more active, gland was generally greater, than the response elicited on the side of stimulation from a relatively inactive gland. Asymmetric salivation appears to depend naturally upon forced use of one side for mastication, due to the presence of unequal defects of right or left molars. Such a condition may be reproduced experimentally by training subjects to practice unilateral mastication at every meal for a number of days. (Author)

AD-640 313 **Field 6P**
CFSTI Prices: HC$3.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE CEREBRAL CORTEX AND THE FUNCTION OF THE VESTIBULAR APPARATUS: SELECTED PARTS,
by E. Sh. Airapetyants, and V. A. Kislyakov. 29 Jul 66, 53p FTD-TT-66-30
TT-66-62447
Unedited rough draft trans. of mono. Kora Bolshikh Polusharii i Funktsiya Vestibulyarnogo Apparata, Moscow/Leningrad, 1962 p1-4, 604-19.

Descriptors: (*Vestibular apparatus, Central nervous system), Cerebral cortex, Semicircular canals, Reflexes, Nystagmus, Conditioned reflex, Proprioception, USSR.

AD-640 459 **Field 6P**
Not available from CFSTI.
Army Medical Research Lab., Fort Knox, Ky. Experimental Physiology Div.
WAVELENGTH AND INTENSITY EFFECTS OF THE RESPONSE OF SINGLE LATERAL GENICULATE NUCLEUS UNITS IN THE OWL MONKEY,
by Arthur E. Jones. 3 Mar 65, 23p
Proj. DA-3A014501B71P
Task 08
AMRL-668
Availability: Published in Journal of Neurophysiology v29 p125-38 1966.

Descriptors: (*Monkeys, *Vision), (*Electrophysiology, Monkeys), Adaptation (Physiology), Retina.

Electrophysiological studies with semimicroelectrodes and microelectrodes were carried out to determine the functional organization of the LGN and the spectral sensitivity of the retinal elements as reflected in the activity of single LGN units. Semimicroelectrode studies confirm that the functional organization of the LGN parallels the anatomical organization. Microelectrode recording revealed cells which responded either by decreasing their rate of activity or increasing their rate of activity and were classed as broad band inhibitors or broad band on cells. Cells in layers 4 and 3 were of both types, but only inhibitors were found in the ventral layers. Only two of 185 cells responded

to stimulation of either eye. All other cells responded only to stimulation of the eye appropriate to the lamina. The spectral sensitivity plots of 143 cells reflected three classes of cells with peak sensitivities at about 500, 530, and 560 millimicrons. The spectral sensitivity peak of each cell was determined by fitting against 22 templates, constructed from Dartnall's (1953) nomogram for visual pigments, with lambda-max at 5 millimicrons and determining which template best fit the data points. Analysis of the individual unit spectral sensitivity and the summed spectral sensitivity of all units indicated that more than one pigment was contributing to the luminosity functions of the owl monkey. (Author)

AD-640 460 **Field 6P**
Not available from CFSTI.
Army Medical Research Lab., Fort Knox, Ky. Biophysics Div.
COMPARISON OF SERUM PROTEINS IN AMERICANS AND ESKIMOS.
by Anthony J. Luzzio. 28 Jun 65, 12p
Proj. DA-6X61-06-001
Task 02
AMRL-666
Availability: Published in Journal of Applied Physiology v21 n2 p685-8 Mar 1966.

Descriptors: (*Acclimatization, Humans), (*Blood proteins, Periodic variations), Greenland, United States, Electrophoresis, Females.

Identifiers: Eskimos, Caucasians.

The sera of healthy male and female Eskimos in Greenland and Americans in the United States showed that, except for albumin, all proteins, as well as total serum protein, are at their highest for the Eskimos during the summer. The values for the Americans did not show a seasonal variation and approximated the winter levels of the Eskimos. In addition, male Caucasians were tested while living in the United States and after they were moved to Greenland. Similar 'seasonal' increases in total proteins and certain globulins were seen in Americans moved to Greenland as in the Eskimos resident there. The evaluation of a limited number of physiologic variants favors cold per se as the principal contributing factor for the seasonal changes observed. No significant differences in serum protein levels were found between sexes within each group. However, a race X sex interaction showed that alpha- and beta-globulins were highest in Eskimo females and next highest for American males. (Author)

N66-27495 **Field 6P**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
METHODS OF INVESTIGATING THE VESTIBULAR APPARATUS.
Metody Issledovaniya Vestibulyarnogo Apparata
by R. M. Bayevskiy. May 66, 11p NASA-TT-F-10125
Transl. Into English From The Publ. "fiziologicheskiy Metody V Kosmonavtike" Moscow, Izd. "nauka," 1965 P246-250

Descriptors: *Manned space flight, *Physiological telemetry, *Vestibular apparatus, Apparatus, Electrooculogram, Manned, Muscle, Nystagmus, Oscillation, Physiology, Reaction, Space flight, Striation, Telemetry, Vestibular.

For abstract, see S 04 15.

N66-28585 **Field 6P**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
RENAL FUNCTION DURING HEAVY MUSCULAR WORK.
Ueber Die Nierenfunktion Waehrend Schwerer Muskelarbeit
by F. G. Covian, and P. B. Rehberg. Jun 66, 26p NASA-TT-F-10205
Transl. Into English From Skan. Arch. Physiol. (Scandinavia), V. 75, 1936 P 21-37

Descriptors: *Creatinine, *Muscular fatigue, *Renal function, *Urea, Absorption, Diffusion, Diuresis, Fatigue, Filtration, Function, Heavy, Human, Kidney, Loss, Muscle, Renal, Water, Work.

For abstract, see S 04 16.

N66-28746 **Field 6P**
CFSTI Prices HC$1.00 MF$0.50
California Inst. Of Tech., Pasadena. Div. Of Biology.
NEURAL CONTROL OF HIBERNATION IN MAMMALS, THE RELEVANCE OF PHYSIOLOGICAL CLOCKS AND ENVIRONMENTAL FACTORS PROGRESS REPORT, 1 SEP. 1965 - 28 FEB. 1966.
1966, 22p NASA-CR-74541
Contract NGR-05-002-031

Descriptors: *Data processing, *Hibernation, *Power spectrum, Biological, Brain, Data, Magnetic, Periodic, Physiology, Power, Process, Processing, Rhythm, Spectrum, Squirrel, Tape.

For abstract, see S 04 16.

N66-29421 **Field 6P**
CFSTI Prices HC$2.00 MF$0.50
Joint Publications Research Service, Washington, D. C.
STUDIES ON THE SECOND PHASE OF NYSTAGMUS.
by A. Noto. Oct 63, 42p NASA-TT-F-8538
NASA ORDER W-11577-B-81
Transl. Into English From Nippon Jibiinkoka Gakkai Kaiho (Japan), P 40-53

Descriptors: *Brain injury, *Caloric stimulus, *Human tolerance, *Nystagmus, *Rabbit, Animal, Brain, Calorie, Cerebellum, Cerebrum, Human, Injury, Phase, Regulation, Rotary, Secondary, Stimulus, Study, Tolerance.

For abstract, see S 04 16.

N66-29539 **Field 6P**
CFSTI Prices HC$1.00 MF$0.50
Royal Air Force, Farnborough (England). Inst. Of Aviation Medicine.
THE EFFECT OF THE INVERTED POSTURE UPON THE DISTRIBUTION OF PULMONARY BLOOD FLOW WITHIN THE LUNGS.
by D. M. Denison, J. Ernsting, D. I. Fryer, and A. B. Pignatelli. Sep 64, 21p FPRC/1229
21 P Refs

Descriptors: *Alveolar air, *Blood flow, *Gravitational effect, *Lung, *Pulmonary circulation, Air, Alveolus, Blood, Circulation, Distribution, Effect, Flow, Gravitational, Inversion, Isotope, Measurement, Pulmonary, Radioactivity, Ventilation, Xenon.

For abstract, see S 04 16.

N66-29574 **Field 6P**
CFSTI Prices HC$1.00 MF$0.50
Naval School Of Aviation Medicine, Pensacola, Fla.
THE THOUSAND VIATOR STUDY - SMOKING HISTORY CORRELATES OF SELECTED PHYSIOLOGICAL, BIOCHEMICAL, AND ANTHROPOMETRIC MEASURES.
by A. Graybiel, N. E. Lane, R. E. Mitchell, and A. Oberman. 27 Apr 66, 20p NASA-CR-75902, NAMI-961
NASA ORDER R-136

Descriptors: *Anthropometry, *Biochemistry, *Physiology, *Tobacco, Blood, Diastolic, Factor, Protein, Skin, Smoke, Social factor, Systolic, Vascular.

For abstract, see S 04 16.

N66-29723 **Field 6P**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
PERCEPTION OF CERTAIN MECHANICAL QUANTITIES INHERENT TO THE ANIMAL ORGANISM.
Vospriyatiye Nekotorykh Mekhanicheskikh Velichin, Svoystvennoye Organizmu Zhivotnogo
by N. A. Chekhonadskiy, and O. G. Gazenko.
May 66, 17p NASA-TT-F-10138
Transl. Into English From Avtometriya (Ussr), No. 2, 1965 P 11-17

Descriptors: *Analog-to-digital converter, *Animal study, *Otolith, *Vestibular apparatus, Analog, Animal, Apparatus, Conversion, Data, Digital, Model, Orientation, Spatial, Study, System, Vestibule.

For abstract, see S 04 16.

AD-639 688 **See Field 5J**

AD-639 768 **See Field 6A**

AD-639 803 **See Field 9C**

AD-639 867 **See Field 5J**

AD-640 081 **See Field 5J**

AD-640 269 **See Field 12A**

AD-640 500 **See Field 6R**

N66-28898 **See Field 1B**

6Q. PROTECTIVE EQUIPMENT

AD-639 631 **Field 6Q, 20F**
CFSTI Prices: HC$1.10 MF$0.50
Naval Medical Research Lab., New London, Conn.
INFRAPAKE SUNGLASS LENS.
Memorandum rept.
8 Mar 52, 4p MR-52-3
NAVMED-NM-003-041.51

Descriptors: (*Eyeglasses, Optical properties), Lenses, Refraction, Hardness, Plastics, Light transmission, Aviation personnel.

AD-639 634 **Field 6Q, 20F**
CFSTI Prices: HC$1.10 MF$0.50
Naval Medical Research Lab., New London, Conn.
'OPTILITE' DARK ADAPTATION GOGGLES.
Memorandum rept.
25 Apr 52, 5p MR-52-7
NAVMED-NM-003-041.51

Descriptors: (*Eyeglasses, Optical properties), Lenses, Vision, Adaptation (Physiology), Light transmission.

AD-640 165 **Field 6Q**
CFSTI Prices: HC$1.10 MF$0.50
Naval Medical Research Lab., New London, Conn.

COMMENTS ON TEST OF EYE SAVERS NIGHT DRIVING GLASSES WITH DOUBLE VALUE INTERCHANGEABLE LENSES.
Memorandum rept.
5 Feb 52, 4p MR-52-1
NAVMED-NM-003-041.51

Descriptors: (*Eyeglasses, Motor vehicle operators), Tests, Light transmission, Lenses, Vision, Safety, Hazards.

It was found that the 'Eye Savers' are not only useless for the purposes for which they are claimed to be designed, but would be detrimental to vision and hazardous to the wearer.

AD-639 701 See Field 7E

AD-639 946 See Field 7E

AD-639 947 See Field 7E

AD-639 948 See Field 7E

6R. RADIOBIOLOGY

AD-639 699 Field 6R
CFSTI Prices: HC$1.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
POLAR TRANSPORT CHARACTERISTICS OF RADIOSTRONTIUM IN ISOLATED CORN ROOT SEGMENTS,
by B. E. Vaughan, E. C. Evans III, and M. E. Hutchin. 11 Jul 66, 19p USNRDL-TR-1047

Descriptors: (*Strontium, Radioactive isotopes), (*Radioactive isotopes, Transport properties), Corn, Radiobiology, Tracer studies, Calcium.

Polar transport in isolated segments of Zea Mays root was verifed using paired simultaneous tracers for Ca and Sr. A model has been presented for determining molar transport rates in the root segments by an improved compartmental glassware system. Sr85 transport exactly parallels variation in Ca45 transport. (Author)

AD-639 758 Field 6R, 20H, 11I
CFSTI Prices: HC$3.00 MF$0.50
Texas Nuclear Corp., Austin.
EXPERIMENTAL FAST NEUTRON DOSIMETRY AND LD 50/30 STUDIES IN MICE.
Final rept.
31 Aug 66, 53p
Contract AF 41 (609)-2947
Proj. AF-7757
Task 775704

Descriptors: (*Neutron scattering, *Radiobiology), (*Plastics, Neutron scattering), Fast neutrons, Dosimeters, Lethal dosage, Polyethylene plastics, Nylon, Dose rate, Neutron flux, Neutron detectors, Gamma rays, Mice.

The report concerns experimental 14 MeV neutron dosimetry using mice as neutron scattering samples and an LD 50/30 study of mice using 14 MeV neutrons and 2 MeV X-rays. The irradiations for the LD 50/30 study were carried out using computed neutron-flux-to-dose values. The experimental neutron dosimetry study is described, not only for mice but for three tissue-equivalent type materials: polyethylene, nylon, and Shonka plastic.

AD-639 836 Field 6R, 6C
CFSTI Prices: HC$1.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
TRANSPORT OF CALCIUM AND STRONTIUM IN THE PRIMARY ROOT OF ZEA MAYS,
by Maxine E. Hutchin, and Burton E. Vaughan.
28 Feb 66, 21p USNRDL-TR-1039
Proj. RDT/E-SR-011-01-01
Task 0401
See also AD-639 699.

Descriptors: (*Radioactive isotopes, Transport properties), (*Tracer studies, Radioactive isotopes), (*Calcium, Radioactive isotopes), (*Strontium, Radioactive isotopes), Corn, Radiological contamination, Nitrophenols, Radiobiology, Absorption (Biological).

Root segments, 55 mm long, were exposed to nutrient containing Sr85 and Ca45 tracers. From 0.25 to 5.0 mM Ca, calcium transport was comparatively unaffected by concentration; but from 0.05 to 0.25 mM, it fell off sharply. The maximum transport of strontium from nutrient containing 0.05 mM Ca was twice that from 2.5 mM Ca, and also twice the maximum calcium transported. Thus, under the condition simulating calcium depletion, i.e., 0.05 mM Ca, greater proportions of strontium were transported. In simultaneous determinations, the ratio of Sr to Ca moved was equal to the ratio of their concentrations in nutrient solution. Dinitrophenol inhibited Ca and Sr movement similarly. (Author)

AD-640 158 Field 6R
CFSTI Prices: HC$2.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
X-IRRADIATION OF DEFINED AREAS OF THE HEADS OF WEANLING RATS: EFFECT ON BODY GROWTH AND INCISOR DEVELOPMENT,
by Louis W. Wachtel, Leonard J. Cole, and J. Stanley Bailey. 26 Aug 66, 29p USNRDL-TR-1061
NAVMED-MR005.08-0010

Descriptors: (*Radiation effects, *Head), X rays, Body, Growth, Teeth, Throat, Tongue, Pathology, Radiological dosage, Radiation injuries, Ingestion (Physiology), Mortality rates, Metabolism, Rats.

Weanling rats whose bodies were lead-shielded, were X-irradiated to defined areas of the head. Body growth, incisal tooth development, and histopathology of the tongue and glossopharyngeal area (throat) were studied for a period of 7 weeks following irradiation. An X-ray dose of 2000 rads to the head and throat caused injury to the tongue and palate which resulted in a reduction in food intake and a marked loss in weight of the exposed rats. The more extensive the head area irradiated the higher the mortality, attaining 100 per cent deaths at 9-10 days when the entire head was irradiated. Irradiation of the throat only with 2000 rads elicited 50 per cent deaths. There was a persistent reduction in the growth rate of the survivors compared to that of non-irradiated controls. These effects were not seen if the base of the tongue only was irradiated. The maxillary incisors, which received 120 rads through the lead shielding, after 5-7 weeks were either lost or grew abnormally in all throat-irradiated rats. The same dose of X-radiation to the incisors of rats in which the base of the tongue only was irradiated, had no deleterious effect on their development. The possibility of a relationship between metabolic disturbances caused by throat irradiation, and growth of the incisors receiving low doses of X-radiation, is postulated and discussed. (Author)

AD-640 316 Field 6R
CFSTI Prices: HC$2.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
THE RESPONSE OF ERYTHROPOIETIC STEM CELLS OF MICE TO IRRADIATION WITH FISSION NEUTRONS,
by J. S. Krebs. 19 Aug 66, 31p USNRDL-TR-1059
NAVMED-MR005.08-0009

Descriptors: (*Fission neutrons, *Radiobiology), (*Hemopoietic system, *Radiation effects), (*Erythrocytes, Radiation effects), Cells (Biology), Bone marrow, Radiological dosage, Mathematical models, Mice.

The destruction of erythropoietic stem cells by irradiation with fission neutrons was studied in plethoric C57 leaden male mice by measuring the incorporation of Fe59 into erythrocytes 48 hours after a dose of erythropoietin. The survival of stem cells in mice exposed to single doses of neutrons at 37 rad/min. followed the single-hit multi-target model of radiation injury to cells. D is dose, D sub o is 37% dose, and E is target multiplicity. D sub o was a constant, equal to 27.8 rads for all animals, but E varied from 1 to 4 in different animals. The survival of stem cells in mice exposed to single doses of neutrons at 1.75 rad/min. followed the single-hit multi-target model, with D sub o = 26 rad, for those animals for which E = 1, but animals with E>1 did not fit the model. The survival of stem cells in mice exposed to 3 doses at 37 rad/min. at intervals of 10-12 hours also followed the single-hit multi-target model, with mean D sub o = 26 rad, and a distribution of values of E similar to that in the single dose. The data strongly imply that the loss of stem cells follows the multi-target model, but that E, instead of being a constant, is a basic biological variable of the response. (Author)

AD-640 500 Field 6R, 6P, 6M
CFSTI Prices: HC$2.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
EFFECTS OF CONTINUOUS IRRADIATION OF MICE ON THE IMMUNE RESPONSE TO LIVE LISTERIA MONOCYTOGENES VACCINE,
by R. H. Stewart, F. A. Hodge, and M. S. Silverman. 19 Sep 66, 28p USNRDL-TR-1072
NAVMED-MR005.08-0007

Descriptors: (*Radiation effects, *Mice), (*Immunity, *Listeria monocytogenes), Infections, Respiratory diseases.

Mice exposed continuously to radiation delivered at 1.0-1.5 rad/hour were exposed to a respiratory infection with a midlethal dose of a live avirulent strain of Listeria monocytogenes immediately after accumulating either 1700-2200 rad or 2800-3000 rads. The surviving mice were challenged two weeks later with a second aerosol containing the organism in order to determine their immune state. All of the nonirradiated mice exposed to the two aerosol infections survived while 24% of the 1700-2200 rad irradiated mice and 54% of the 2800-3000 rad groups succumbed to the second infection. If the irradiated mice were immunized with two aerosol exposures at a two week interval both the irradiated (2200 rad) and the non-irradiated animals survived. Immunity following a single exposure was of short duration. If the challenge was postponed until 4 weeks after the immunizing exposure, 90% of the irradiated mice died. Clearance of L. monocytogenes from the lungs, liver and spleen was rapid in the non-irradiated immune group. By the fourth day after challenge, few organisms could be isolated. If the mice were irradiated prior to immunization, clearance was delayed. Bacteria could still be found in all organs. Large numbers of bacteria could be isolated from both groups of non-immune mice. (Author)

BNL-985 Field 6R, 18B
CFSTI Prices: HC$1.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
MEASUREMENT OF MEGARAD DOSES OF 60 CO GAMMA RAYS WITH ULTRAVIOLET-TRANSMITTING LUCITE,
by A. C. Muller, F. X. Rizzo, and R. B. Mogk.
Mar 66, 9p
Contract AT (30-2)-GEN-16

Descriptors: (*Gamma rays, *Dosimeters).

For abstract, see N 20 19.

IDO-17182 Field 6R, 18D, 20H, 18G
CFSTI Prices: HC$7.00 MF$1.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.

HEALTH PHYSICS TECHNICIAN TRAINING MANUAL.
by H. W. Stroschein, and P. H. Maeser. Jun 66, 304p
Contract AT (10-1)-205

Descriptors: (*Instruction manuals, *Health physics).

For abstract, see N 20 19.

LA-3396 **Field 6R, 18I, 18L**
CFSTI Prices: HC$3.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
RADIATION MEASUREMENTS OF THE EFFLUENT FROM THE PHOEBUS 1A-321 REACTOR.
by R. W. Henderson, O. W. Larson, and R. V. Fultyn. Feb 66, 59p
Contract W-7405-eng-38

Descriptors: (*Power reactors, *Radiological dosage).

For abstract, see N 20 19.

LA-3447 **Field 6R, 18I**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
DOSE RATE MEASUREMENTS ON THE KIWI B-4D-202 AND KIWI B-4E-301 REACTORS,
by F. W. Sanders. Jan 66, 21p
Contract W-7405-eng-36

Descriptors: (*Radiological dosage, *Nuclear reactors).

For abstract, see N 20 19.

N66-29464 **Field 6R**
CFSTI Prices HC$2.00 MF$0.50
Medical Coll. Of Virginia, Richmond. Radiation Physics Div.
INVESTIGATION OF TOTAL ENERGY ABSORPTION IN OMNIDIRECTIONAL GAMMA-RAY, BREMSSTRAHLUNG AND NEUTRON FLUXES STATUS REPORT NO 2, 16 JUN. 1965 - 28 FEB. 1966.
by F. T. Ofoghludha. 28 Mar 66, 38p NASA-CR-75884
Contract NGR-47-002-004

Descriptors: *Chemical analysis, *Energy absorption, *Gamma ray beam, *Irradiation, *Spectral analysis, Absorption, Analysis, Beam, Chemical, Energy, Gamma, Matrix, Mounting, Omnidirectional, Phantom, Programming, Ray, Response, Spectrum, Speed.

For abstract, see S 04 16.

N66-29752 **Field 6R**
CFSTI Prices HC$1.00 MF$0.50
Naval School Of Aviation Medicine, Pensacola, Fla.
A NOTE ON THE DOSIMETRIC INTERPRETATION OF RIGIDITY SPECTRA FOR SOLAR PARTICLE BEAMS.
by H. J. Schaefer. 26 Apr 66, 20p NASA-CR-76044, NAMI-960
NASA ORDER R-75

Descriptors: *Corpuscular radiation, *Dosimetry, *Radiation spectrum, *Solar flare, Aerospace, Alpha, Corpuscular, Dose, Effect, Exposure, Flare, Flux, Health, Medicine, Particle, Physics, Proton, Radiation, Rigidity, Shielding, Solar, Spectrum.

For abstract, see S 04 16.

N66-36055 **Field 6R**
CFSTI Prices HC$1.00 MF$0.50
Massachusetts General Hospital, Boston. Radiology Dept.
SOLID CHEMICAL RADIATION DOSIMETER SEMIANNUAL REPORT.
by M. S. Potsaid, and S. Shibata. 1 Jul 66, 16p
NASA-CR-77801

Descriptors: *Chemical effect, *Dosimeter, *Radiation meter, *Temperature effect, *X-ray irradiation, Acid, Azo, Change, Color, Compound, Concentration, Dye, Effect, Halogen, Irradiation, Light, Matrix, Measurement, Meter, Paraffin, Production, Radiation, Strength, Temperature, Transmittance, X-ray.

For abstract, see S 04 21.

PB-170 918 **Field 6R, 6C, 2D**
CFSTI Prices: HC$3.60 MF$0.50
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
QUELQUES APPLICATIONS DE L'ANALYSE PAR RADIOACTIVATION NEUTRONIQUE EN BIOLOGIE VEGETALE ET EN AGRONOMIE. (Some Applications of Neutron Activation Analysis in Plant Biology and Agronomy),
by Andre Fourcy. Jun 66, 41p CEA-R-2967
Text in French; Summary in English.

Descriptors: (*Plants (Botany), Radioactivation analysis), Neutron activation, Manganese, Copper, Cobalt, Iron, Zinc, Potassium, France.

Plant materials are not so commonly analysed by radioactivation as biological extracts of medical importance. With help of concrete examples, applications of neutron activation analysis to the determination of some metals (Mn, Cu, Co, Fe, Zn and K) in plant materials, are proposed. Samples are activated in a swimming-pool reactor for a time varying between few minutes and several days according to the element being analysed. The induced radioactivity is measured by spectrometry, with radiochemical separation (Cu, Co, Fe, Zn and K) or without separation in best cases (Mn, Cu, K). Described dosages are related to : manganese in a graminaceous plant, copper in vine treatments, cobalt, iron and zinc in animal feeding, potassium in a radioecological experiment. (Author)

PB-170 924 **Field 6R**
CFSTI Prices: HC$8.60 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
DONNEES HISTOLOGIQUES SUR LE PORC (SUS SCROFA) UTILISABLES EN RADIOBIOLOGIE. I. HISTOLOGIE NORMALE DE CERTAINS APPAREILS. II. ETUDE DES LESIONS CONSECUTIVES A UNE IRRADIATION GAMMA TOTALE (Histological Data Concerning the Pig (Sus Scrofa) for Use in Radiobiology. I. Normal Histology of Certain Systems. II. Injuries Caused by Total Irradiation),
by Jean-Louis Guenet, Marcel Vaiman, and Pierre Nizza. Jun 66, 83p CEA-R-2978
Text in French; Attached Summary in English.

Descriptors: (*Histology, *Radiation effects), (*Swine, Laboratory animals), Radiation injuries, Gamma rays, Whole body irradiation, France.

The domestic pig has lately become a laboratory whose anatomical and physiological characteristics appear to be appreciated for certain radiobiological studies. The report describes research which was carried out (in particular in the field of histology) on domestic pigs of different species with a view to compiling a record which might be of help to future workers in this field. The second part of the work deals with anatomical and histological injuries caused by total exposure to gamma radiation from cobalt 60 at doses of around 285 rads. (Author)

PB-170 925 **Field 6R**
CFSTI Prices: HC$6.60 MF$0.75
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
RADIOSENSIBILITE DES CHLORELLES AUX ELECTRONS ACCELERES DE MOYENNE ENERGIE (Radiosensibility of Chlorella After Medium Energy Accelerated Electron Irradiation).
Doctoral thesis in French.
by Jean-Claude Roux. 1966, 65p CEA-R-2984
Text in French; Attached Summary in English.

Descriptors: (*Algae, Electron bombardment), (*Chlorella, Radiobiology), Viability, Reproduction (Physiology), Dose rate, Radiation effects, Oxygen, France.

The survival curves (capability of multiplication) of Chlorella pyrenoidosa after irradiations can be used for soft electrons (0.65 and 1 MeV), hence penetrating into only 2 to 4 millimeters of water: the algae are laying on porous membranes and the doses are calculated from the power of the electron beam measured by the electric current on a metallic target or by Fricke's dosimetry. With these technics, it is showed and discussed the part of anoxia in the radioprotection (magnitude or reduction of the doses calculated on the slope of survival curves: 2.5) that is more important than the restoration studied by the fractionation of the doses. The 0.65 and 1 MeV electrons have a biologic effect lesser than 180 keV X-rays (RBE calculated on the slope of survival curves 0.92 in aerated irradiation, 0.56 in the desoxygenated irradiation.) (Author)

AD-639 641 **See Field 6O**

AD-640 261 **See Field 6E**

CEX-61.7.2 **See Field 18H**

IDO-17151 **See Field 9B**

LA-3491 **See Field 7D**

N66-35671 **See Field 14B**

ORNL-3901 **See Field 18I**

PB-170 926 **See Field 7E**

PNE-717F **See Field 18H**

UCRL-14440 **See Field 13M**

6S. STRESS PHYSIOLOGY

AD-458 350 **Field 6S**
CFSTI Price: HC$1.60
Aeromedical Research Lab. (6571st), Holloman AFB, N. Mex.
CHIMPANZEE HEMATOLOGIC ALTERATIONS DURING AND FOLLOWING 24 HOURS OF RESTRAINT.
Interim rept., Nov 61-May 63,
by Ralph A. Scott Jr. Oct 64, 17p ARL-TR-64-13
Proj. AF-6892
Task 689203

Descriptors: (*Stress (Psychology), Hematology), (*Chimpanzees, Attachment), Laboratory equipment, Physiology, Aging (Physiology), Sex, Time, Dehydration, Blood counts, Hemoglobin, Hematocrit, Erythrocytes, Leukocytes, Blood platelets, Blood sedimentation, Data.

Chimpanzee response to 24 hours of restraint was measured by determining hemotologic alterations in blood drawn immediately before, immediately after, and 24 hours post-restraint. The values are analyzed for significance deviations in relation to age, sex, and duration of restraint. Pronounced alterations with restraint occurred in most of the formed elements determined. The formed ele-

ments of the blood support a hypothesis that a state of dehydration exists during restraint. (Author)

AD-639 625 **Field 6S, 5I**
CFSTI Prices: HC$3.60 MF$0.50
Naval Medical Research Lab., New London, Conn.
OBSERVATIONS ON EFFICIENCY OF SUBMARINE PERSONNEL DURING PROLONGED SUBMERGENCE WHEN THE ATMOSPHERIC OXYGEN IS MAINTAINED AT 17% AND THE CARBON DIOXIDE AT 3%.
Final rept.,
by J. E. Karlin, and J. F. Curtis. 27 Jul 45, 51p
Rept. no. 70, Vol. 4
NAVMED-X-516 (Sub. No. 105)

Descriptors: (*Stress (Physiology), Submarine personnel), (*Submarine personnel, Performance (Human)), (*Respiration, Submarine personnel), Oxygen, Carbon dioxide, Physical fitness, Visual perception, Voice communication systems, Closed ecological systems, Visual perception, Radar operators, Sonar personnel, Hearing, Speech, Memory, Color vision, Attention, Tests.

The purpose of this investigation was to determine whether the operating efficiency of submarine personnel deteriorated during submergence when the atmospheric oxygen was maintained at 17% and the carbon dioxide at 3% for extended periods. The results of the observations show: (a) Very definitely decreased capacity for physical work for all hands. (b) Very definite decrease in efficiency of night vision for about one third of the ship's company. (c) Indications of marked decrement in mental efficiency for all hands. (d) Very probable decrease in efficiency of interior voice communications. (e) Noticeable, but unproven, tendency towards general decrease in efficiency of radar watch and watch on the bow and stern planes. (f) No indication of deterioration in straightforward listening performance for sonar signals. (g) No reliable evidence either on efficiency in watching the 'Christmas Tree' or memory for numbers.

AD-639 637 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Civil Aeromedical Research Inst., Oklahoma City, Okla.
PHASE SHIFTS OF THE HUMAN CIRCADIAN SYSTEM AND PERFORMANCE DEFICIT DURING THE PERIODS OF TRANSITION: I. EAST-WEST FLIGHT,
by G. T. Hauty, and T. Adams. Dec 65, 12p
AM-65-28
See also PB-170 799 and PB-170 826.

Descriptors: (*Rhythm (Biology), Aviation medicine), Performance (Human), Flight, Fatigue (Physiology), Behavior, Medical examination, Psychology, Physiology.

At periodic intervals throughout the biological day, biomedical assessments were made for a week prior to jet flight to Manila, for 8 days of layover at Manila, and for a week following return. The rapid translocation effected primary phase shifts as follows: for rectal temperature and heart rate, 4 days; for palmar evaporative water loss, 8 days. The return flight effected a 1-day phase shift. Behavoral integrity was degraded, although to a lesser extent after return. Duration of behavioral impairment was much shorter than the lag time of physiological phase shifts. (Author)

AD-639 669 **Field 6S**
CFSTI Prices: HC$2.00 MF$0.50
Brussels Univ. (Belgium). Lab. of Experimental Medicine.
RESEARCH CONCERNING THE INFLUENCE OF ACUTE EXPOSURE TO COLD ON THE THYROID FUNCTION.
Final rept. 1 Sep 63-31 Aug 65,
by A. M. Ermans, and M. Camus. Jul 66, 38p
Contract AF 61 (052)-714
Proj. AF-8237
Task 823701
AAL-TR-66-7

Descriptors: (*Thyroid gland, Adaptation (Physiology)), (*Iodine, Metabolism), (*Acclimatization, Thyroid gland), Exposure, Cold weather tests, Thyroid hormones, Thyroxine, Tracer studies, Belgium.

Identifiers: Cold tolerance, Protein-bound iodine.

The quantitative aspects of iodine metabolism were evaluated in normal healthy human subjects by means of a tracing method and long-term iodine balance studies. The behavior of the specific activities of hormonal iodine in the intra- and extrathyroidal compartments cannot be explained on the basis of a relationship of precursor to product when the thyroidal compartments are considered as a whole. On the contrary, experimental findings fit with such a relationship if one considers the fraction of the thyroid compartment which is mobilized by exogenous TSH. A kinetic model of iodine metabolism taking account of such a functional heterogeneity was studied by means of digital and analog computers. One interesting aspect of this heterogeneity is the very high specific activity of the organic iodine released by TSH, when TSH is given a short time after the administration of radioiodine. This approach appears to be a very sensitive method for the detection of any TSH-like effect on the thyroid gland. This property has been used for the estimation of the influence of an acute exposure to cold on the thyroid function of eight volunteers. Twenty-four hours after the administration of I-125 the volunteers were kept for two hours at 4 C. A marked increase of the levels of PBI-125 was observed four hours after the end of cold exposure; plasma PBI-127 was also increased but to a lesser extent; the validity of these findings was checked by a parallel experiment at normal temperature. (Author)

AD-639 689 **Field 6S**
Not available from CFSTI.
School of Aerospace Medicine, Brooks AFB, Tex.
OBSERVATIONS ON MAN IN AN OXYGEN-HELIUM ENVIRONMENT AT 380 mm. Hg TOTAL PRESSURE: I. CLINICAL,
by Howard J. Zeft, Victor S. Behar, David G. Quigley, Frode Ulvedal, and E. G. Shaw. May 66, 9p SAM-TR-66-232
Proj. AF-7930
Task 793002
Availability: Published in Aerospace Medicine v37 n5 p449-53 May 1966.

Descriptors: (*Pressure breathing, Stress (Physiology)), (*Space medicine, *Respiration), Helium, Oxygen, Barometric pressure, Closed ecological systems, Space simulation chambers, Confined environments, Hematology, Electrolytes (Physiology), Liver function tests.

The effects of a 15-day exposure to an environment with a PO2 of 165.4 mm. Hg and a PHe of 205.5 mm. Hg at 379.9 mm. Hg total pressure have been studied in four healthy young men. Initially, all developed conjunctivitis associated with decreased relative humidity which cleaned by increasing water vapor pressure. One individual was removed from the chamber prior to completion of the experiment because of the unrelated development of an acute prostatitis. No hemoatologic, electrolyte, or liver function abnormalities were noted. Stress testing showed some deconditioning from confinement. From this limited study, there appears to be no medical contraindication to the use of this environment for future space cabin atmospheres. (Author)

AD-639 752 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Instituto de Biologia Andina, Lima (Peru).
HUMORAL CONTROL OF THE ERYTHROPOIESIS DURING ALTITUDE CHANGES.
Annual rept. no. 1, May 65-Apr 66,
by Cesar Reynafarje, Jose Ramos, Jorge Gurmendi, Doris Villavicencio, and German Anduaga. Apr 65, 21p
Grant DA-ARO-49-092-65-G90
Proj. DA-2N014501B71D-00-026-LA

Descriptors: (*Hypoxia, *Hematology), (*Acclimatization, *Hemopoietic system), Erythrocytes, High altitude, Urine, Peru.

A study was made of humoral control of erythropoietic activity in men during and after altitude exposure. Plasma from sea level subjects after 8, 24 and 48 hours of exposure to 4,450 meters of altitude produced a gradual increase of erythropoietic activity in starved rats. Urinary extracts had the same effect in samples obtained after 24 and 48 hours. No increase of erythropoietic activity was observed in plasma or urinary extracts from altitude natives when injected to rats. A depressing effect of plasma filtrate from altitude natives after 9 days of residence at sea level had a depressory effect on erythropoiesis in rats exposed to 18,000 feet. No changes of erythropoietic activity were observed when urinary extracts of natives of altitude were injected into starved rats after several periods of time at sea level. Additional observation in the urinary extracts from aplastic patients showed a very high degree of erythropoietic activity which diminished in patients successfully treated with anabolic steroid (meta-androstenolona). (Author)

AD-639 780 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Civil Aeromedical Research Inst., Oklahoma City, Okla.
HYPOXIA AND PERFORMANCE DECREMENT,
by William F. O'Connor, Jim Scow, and George Pendergrass. May 66, 7p
AM-66-15

Descriptors: (*Hypoxia, Performance (Human)), Motor reactions, Degradation, Stress (Physiology), Performance tests, Aviation medicine.

The concept of 'time of useful consciousness' fails to take into account the progressive decay that occurs in performance under hypoxic conditions. This study, using a means of quantitatively assessing such a decrement, presents data obtained in a series of chamber runs at 27,500 and 35,000 feet. The performance-decrement functions appear to follow the arterial-oxygen-saturation curves. (Author)

AD-639 827 **Field 6S**
Not available from CFSTI.
Karolinska Institutet, Stockholm (Sweden). Dept. of Physiology.
ACCELERATION OF NORADRENALINE TURNOVER IN THE MOUSE HEART BY COLD EXPOSURE,
by A. Oliverio, and L. Stjarne. 1 Jul 65, 9p
Grant AF-EOAR-52-65
Proj. AF-9777
Task 977701
AFOSR-66-1126
Availability: Published in Life Sciences v4 n23 p2339-43 1965.

Descriptors: (*Heart, Levarterenol), (*Levarterenol, Biosynthesis), Exposure, Adaptation (Physiology), Acclimatization, Tolerances (Physiology), Autonomic nervous system, Cold weather tests, Mice.

Identifiers: Cold tolerance.

The rate of disappearance of 3H-NA from the hearts of mice was markedly increased by cold exposure. This indicates that local NA synthesis in the sympathetic nerves of the heart may be feedback regulated by changes in nervous activity. However, even the severest tolerable cold-exposure accelerated the NA disappearance rate, and thus possibly NA synthesis, at the most 2-3-fold.

Since cold exposure may not be an adequate stimulus to produce a maximum activity in the cardioaccelerator nerves, it is conceivable that other types of stimulation might further accelerate the NA turnover in the heart. (Author)

AD-640 163 **Field 6S, 6C**
CFSTI Prices: HC$1.00 MF$0.50
Naval Aerospace Medical Inst., Pensacola, Fla.
THE ELECTROENCEPHALOGRAM OF THE SQUIRREL MONKEY (SAIMIRI SCIUREUS) IN A VERY HIGH MAGNETIC FIELD,
by Dietrich E. Beischer, and James C. Knepton
Jr. 9 Jun 66, 21p NAMI-972
Contract NASA Order-R-39
NAVMED-MR005.13-9010.1.10

Descriptors: (*Electroencephalography, Magnetic fields), (*Monkeys, Electroencephalography), Brain, Nervous system, Stress (Physiology).

In preparation for an appraisal of the possible effect of strong magnetic field on cerebral function electroencephalograms of squirrel monkeys subjected to strong homogeneous and gradient fields (up to 91,250 oersted) were measured. Higher than normal amplitudes and frequencies were found in the recordings from exposed animals. The unusual EEG records are discussed and an attempt is made to explain the observation. The study is part of a plan to investigate interaction of magnetic fields with the nervous system in general. (Author)

AD-640 167 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Naval Medical Research Lab., New London, Conn.
HYPERBARIC OXYGENATION BIBLIOGRAPHY CURRENT TO 1963.
Memorandum rept.
20 Jun 63, 23p MR-63-10
NAVMED-MR005.14-3100-4.01

Descriptors: (*Pressure breathing, Bibliographies), (*Oxygen, Toxicity), Respiration, Pressure, Oxygen consumption, Poisoning, Stress (Physiology).

AD-640 255 **Field 6S, 6K**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
MAN IN A SPACESHIP,
by A. Lebedinskii, S. Levinskii, and Yu. Nefedov.
6 Apr 66, 14p FTD-TT-65-1591
TT-64-51542
Unedited rough draft trans. of Meditsinskaya Gazeta (USSR) v27 n75 (2342) p3 Sep 18 1964.

Descriptors: (*Astronauts, *Space medicine), Space simulation chambers, Closed ecological systems, Space environmental conditions, Adaptation (Physiology), Thresholds (Physiology), Fatigue (Physiology), Performance (Human), Central nervous system, Blood circulation, Life support, USSR.

AD-640 284 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ON THE PROBLEM OF CHANGES IN PHYSICO-CHEMICAL AND BIOLOGICAL PROPERTIES OF PILOTS' SALIVA DURING ROLLING, TURNING, AND HYPOXIA,
by V. V. Efimov, B. V. Tolokonnikov, and V. A. Gamburtsev. 30 Mar 66, 11p FTD-TT-65-1645
TT-66-62426
Unedited rough draft trans. of Byulleten' Eksperimentalnoi Biologii i Meditsiny (USSR) v13 n5 p44-7 1942.

Descriptors: (*Pilots, Saliva), (*Saliva, Chemical analysis), Aviation medicine, Motion sickness, Hypoxia, Roll, Rotation, Autonomic nervous system, Vestibular apparatus, Surface tension, USSR.

AD-640 383 **Field 6S**
CFSTI Prices: HC$4.60 MF$0.50
Army Research Office, Washington, D. C.
A SUMMARY OF THE ARMY RESEARCH OFFICE CONFERENCE ON OXYGEN REQUIREMENT AND SUPPLY TO TROOPS AT HIGH ELEVATIONS,
by Allan L. Forbes. Jun 63, 50p
Conference sponsored by ARO, Life Sciences Div., Washington, D. C., 27 Mar, 3, 10, 17 and 24 Apr 63.

Descriptors: (*Respiration, *High altitude), (*Acclimatization, High altitude), Stress (Physiology), Oxygen, Hypoxia, Hyperventilation, Lungs, Edema, Diet, Metabolism, Blood diseases, Toxicity, Pharmacology, Blood circulation, Fatigue (Physiology), Aging (Physiology), Physical fitness, Symposia.

Identifiers: Mountain sickness.

AD-640 461 **Field 6S**
Not available from CFSTI.
Army Medical Research Lab., Fort Knox, Ky. Experimental Psychology Div.
MODIFICATION OF VESTIBULAR NYSTAGMUS BY CHANGE OF TASK DURING STIMULATION,
by James H. Brown. 22 Feb 66, 17p
Proj. DA-3A014501B74C
Task 00
AMRL-667
Availability: Published in Perceptual and Motor Skills v22 n603-11 1966.

Descriptors: (*Nystagmus, Acceleration), (*Vestibular apparatus, Acceleration), Stimulation, Stress (Physiology), Aviation medicine, Acceleration tolerance.

The extent to which changes in task-controlled arousal can influence nystagmic output during both angular acceleration and subsequent constant velocity was examined. Two groups of 12 Ss each received a series of 16 deg/sec/sec angular accelerations during which alertness states were varied from mental arithmetic to reverie or vice versa at selected intervals. Analysis of variance indicated that task-controlled arousal significantly influences nystagmic output both during angular acceleration and during constant velocity. This finding is at variance with predictions based on earlier work which indicated that arousal influenced nystagmic output only during the acceleration. (Author)

N66-27501 **Field 6S**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
PHYSIOLOGY OF WATER AND SODIUM CHLORIDE.
Zur Physiologie Des Wassers Und Des Kochsalzes
by O. Cohnheim, G. Kreglinger, L. Tobler, and O. H. Weber. May 66, 35p NASA-TT-F-10146
Transl. Into English From Z. Physiol. Chem. (Berlin), V. 78, 1912 P 62-88

Descriptors: *Human body, *Physiology, *Sodium chloride, *Weight, Body, Chloride, Diet, Excretion, Exertion, Fatigue, High altitude, Human, Hydrogen, Loss, Muscle, Physical, Salt, Sodium.

For abstract, see S 04 15.

N66-27623 **Field 6S**
CFSTI Prices HC$5.00 MF$1.25
Library Of Congress, Washington, D. C. Science And Technology Div.
AEROSPACE MEDICINE AND BIOLOGY. AN ANNOTATED BIBLIOGRAPHY. CUMULATIVE INDEXES, 1952-1961 LITERATURE, VOLUME I-X.
by R. Kenk, and E. S. Valliere. 1966, 194p
NASA-CR-75598

Descriptors: *Aerospace medicine, *Bibliography, Aerospace, Annotation, Author, Biology, Cumulative, Index, Medicine, Subject.

For abstract, see S 04 15.

N66-27624 **Field 6S**
CFSTI Prices HC$7.47 MF$2.25
Library Of Congress, Washington, D. C. Science And Technology Div.
AEROSPACE MEDICINE AND BIOLOGY. AN ANNOTATED BIBLIOGRAPHY. 1958-1961 LITERATURE, VOLUMES VII-X, PART 1.
by R. Kenk, and E. S. Valliere. 1966, 448p
NASA-CR-75599
Sponsored By Nasa And Af

Descriptors: *Abstract, *Aerospace medicine, *Bibliography, *Neurophysiology, *Psychology (gen), Aerospace, Biology, Environment, Factor, Medicine, Physiology, Psychology, Stress (biol).

For abstract, see S 04 15.

N66-27625 **Field 6S**
CFSTI Prices HC$11.64 MF$4.00
Library Of Congress, Washington, D. C. Science And Technology Div.
AEROSPACE MEDICINE AND BIOLOGY. AN ANNOTATED BIBLIOGRAPHY. 1958-1961 LITERATURE, VOLUMES VII-X, PART 2.
by R. Kenk, and E. S. Valliere. 1966, 865p
NASA-CR-75597
Sponsored By Nasa And Af

Descriptors: *Abstract, *Aerospace medicine, *Bibliography, *Life support system, *Pharmacology, *Survival, Biology, Environment, Factor, Integration, Life, Man-machine, Rescue, Safety, Stress (biol), Support, System, Toxicology.

For abstract, see S 04 15.

N66-28007 **Field 6S**
CFSTI Prices HC$1.00 MF$1.00
National Aeronautics And Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY - A CONTINUING BIBLIOGRAPHY, APRIL 1966.
May 66, 168p NASA-SP-7011/24/

Descriptors: *Aerospace medicine, *Bibliography, *Biology, *Physiology, Aerospace, Exobiology, Human, Index, Life, Medicine, Personnel, Pharmacology, Psychology, Safety, Sanitation, Space, Support, Survival, Toxicology.

For abstract, see S 04 15.

N66-28777 **Field 6S**
CFSTI Prices HC$3.00 MF$0.75
Naval Air Engineering Center, Philadelphia, Pa. Aerospace Crew Equipment Lab.
A REPORT OF THE PHYSIOLOGICAL, PSYCHOLOGICAL, AND BACTERIOLOGICAL ASPECTS OF 20 DAYS IN FULL PRESSURE SUITS, 20 DAYS AT 27,000 FEET ON 100 PERCENT OXYGEN, AND 34 DAYS OF CONFINEMENT, PART I.
by K. R. Coburn. 1 Apr 66, 94p NASA-CR-65394, NAEC-ACEL-535, PT. I
NASA ORDER T-25750-G

Descriptors: *Oxygen toxicity, *Physiological response, *Pressurized suit, *Psychological factor, *Spacecraft environment, Bacteriology, Balance, Blood, Clothing, Confinement, Environment, Factor, High altitude, Human, Metabolism, Nutrition, Oxygen, Physiology, Plant, Pressure, Psychology, Response, Space, Spacecraft, Suit, Water.

For abstract, see S 04 16.

N66-28783 **Field 6S**
CFSTI Prices HC$2.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aerospace Crew Equipment Lab.
A REPORT OF THE PHYSIOLOGICAL, PSYCHOLOGICAL, AND BACTERIOLOGICAL ASPECTS OF 20 DAYS IN FULL PRESSURE SUITS, 20 DAYS AT 27,000 FEET ON 100 PER CENT OXYGEN, AND 34 DAYS OF CONFINEMENT, PART III FINAL REPORT, 2 JUN. 1964 - NOV. 1965.
by K. R. Coburn. 1 Apr 66, 48p NASA-CR-65396, NAEC-ACEL-535, PT. III
NASA ORDER T-25750-G

Descriptors: *Bacteriology, *Physiological effect, *Pressurized suit, *Psychological effect, Balance, Blood, Effect, Factor, High altitude, Human, Hygiene, Metabolism, Nutrition, Oxygen, Physiology, Pressure, Psychology, Renal, Suit, Time, Time factor, Water.

For abstract, see S 04 16.

N66-29357 **Field 6S**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
LIPID AND GLYCOGEN RESERVES IN HUMANS DURING PROLONGED WORK.
by R. A. Adachi, G. A. Brooksby, J. R. Debro, R. Pelligra, and D. R. Young. 1964, 21p NASA-TM-X-56762
Submitted For Publication

Descriptors: *Glycogen, *Human body, *Lipid metabolism, *Work capacity, Biochemistry, Body, Capacity, Carbohydrate, Energy, Exercise, Human, Insulin, Lipid, Metabolism, Physiology, Prolongation, Work.

For abstract, see S 04 16.

N66-35774 **Field 6S**
CFSTI Prices HC$1.00 MF$0.50
Naval School Of Aviation Medicine, Pensacola, Fla. Naval Aerospace Medical Inst.
THE INVERSION ILLUSION IN PARABOLIC FLIGHT - ITS PROBABLE DEPENDENCE ON OTOLITH FUNCTION.
by A. Graybiel, and R. S. Kellogg. 20 Jul 66, 19p NASA-CR-77628, NAMI-974
NASA ORDER R-93

Descriptors: *Auditory perception, *Human reaction, *Parabolic flight, *Visual perception, *Weightlessness, Auditory, Deafness, Flight, Gravity, Human, Kinesthesis, Normal, Orientation, Parabolic, Perception, Pressure, Reaction, Space, Touch, Upright, Visual, Zero.

For abstract, see S 04 21.

N66-36373 **Field 6S**
CFSTI Prices HC$1.00 MF$1.25
National Aeronautics And Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY A CONTINUING BIBLIOGRAPHY, JUL. 1966.
Aug 66, 178p NASA-SP-7011/27/
With Indexes

Descriptors: *Aerospace medicine, *Bibliography, *Biology, Abstract, Aerospace, Index, Information, Medicine, Retrieval.

For abstract, see S 04 21.

AD-639 645 **See Field 14B**

AD-639 762 **See Field 6A**

AD-639 781 **See Field 6C**

6T. TOXICOLOGY

AD-640 348 **Field 6T, 8A**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
THE PURIFICATION AND CHARACTERIZATION OF THE POISON PRODUCED BY GONYAULAX CATENELLA IN AXENIC CULTURE,
by Edward J. Schantz, Joseph M. Lynch, George Vayvada, Ken Matsumoto, and Henry Rapoport. 15 Nov 65, 5p
Availability: Published in Biochemistry v5 n4 p1191-4 Apr 1966.

Descriptors: (*Poisons, *Plankton), (*Shellfish, Poisons), Mussel poisons, Pelecypoda, Sources, Toxicity, Purification, Chemical analysis, Culture media, Chromatographic analysis, Biological assay, Marine biology.

The paralytic poison produced by the dinoflagellate Gonyaulax catenella in axenic culture has been isolated in pure form. A study of its chemical, physical, and biological properties establishes that it is identical in chemical structure to saxitoxin, the poison isolated from toxic Alaska butter clams, and to the poison isolated from toxic California sea mussels. (Author)

N66-36081 **Field 6T**
CFSTI Prices HC$1.00 MF$0.50
Florida State Univ., Tallahassee. Dept. Of Statistics.
A NOMENCLATURE OF SYMBOLS RELEVANT TO THE PROBABILITY OF CONTAMINATING MARS TECHNICAL REPORT NO. 5.
by R. G. Cornell. 24 Aug 66, 12p NASA-CR-77753
Contract NGR-10-004-029

Descriptors: *Contamination, *Mars (planet), *Nomenclature, *Probability, *Symbol, Biology, Capsule, Decontamination, Event, Exploration, Expression, Mars, Planet, Probe, Statistics.

For abstract, see S 04 21.

AD-640 359 **See Field 6M**

7A. CHEMICAL ENGINEERING

AD-640 145 **Field 7A, 19D**
CFSTI Prices: HC$1.00 MF$0.50
Lehigh Univ., Bethlehem, Pa. Inst. of Research.
MATHEMATICAL AND EXPERIMENTAL INVESTIGATION OF THERMAL INITIATION OF EXPLOSION.
Progress rept., 1 Apr-1 Jul 66,
by George R. Jenkins. 1 Jul 66, 4p
Contract DA-28-017-AMC-1090 (A)
Proj. DA-1C010501A007
See also AD-619 297.

Descriptors: (*Explosions, Kinetic theory), Explosives initiators, Experimental data, Vacuum apparatus, Lead compounds, Azides.

BNL-959 **Field 7A, 11F, 18I, 18L**
CFSTI Prices: HC$2.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
THE IMPACT OF INTEGRATED MULTIPURPOSE NUCLEAR PLANTS ON THE CHEMICAL AND METALLURGICAL PROCESS INDUSTRIES. I. ELECTROCHEMONUCLEAR SYSTEMS,
by Meyer Steinberg. Dec 64, 29p
Contract AT (30-2)-GEN-16

Descriptors: (*Nuclear industrial applications, *Electrochemistry).

For abstract, see N 20 19.

BNL-968 **Field 7A, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
FLUIDIZED-BED REPROCESSING OF STAINLESS STEEL CLAD UO2 POWER REACTOR FUELS,
by C. B. Bartlett, E. Wirsing Jr, S. J. Wachtel, and L. P. Hatch. Nov 65, 15p
Contract AT (30-2)-GEN-16

Descriptors: (*Fluidized bed processes, *Reactor fuel processing).

For abstract, see N 20 19.

BNL-973 **Field 7A, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
REPROCESSING OF NUCLEAR FUELS OF VOLATILITY SEPARATIONS IN FLUIDIZED BEDS,
by S. J. Wachtel, J. J. Reilly, and C. B. Bartlett. Mar 66, 10p
Contract AT (30-2)-GEN-16

Descriptors: (*Fluidized bed processes, *Reactor fuel processing).

For abstract, see N 20 19.

DP-1025 **Field 7A**
CFSTI Prices: HC$3.00 MF$0.75
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
PERFORMANCE OF SIEVE TRAYS UNDER GS HEAVY WATER PROCESS CONDITIONS. PART I. LOW PRESSURE OPERATION,
by Mitchell P. Burgess, Robert G. Garvin, and William C. Scotten. Jun 66, 86p
Contract AT (07-2)-1

Descriptors: (*Heavy water, Fluid dynamic properties).

For abstract, see N 20 20.

PB-170 929 **Field 7A, 13B**
CFSTI Prices: HC$19.10 MF$1.25
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
DESSALEMENT DE L'EAU DE MER PAR UN PROCEDE D'EVAPORATION SANS PAROI (Desalting of Sea Water by a Wall-Less Evaporation Process),
by Charles Kassel, Philippe Sachine, and Roland Vuillemey. 1966, 195p CEA-R-3011
Text in French; Attached Summary in English.

Descriptors: (*Sea water, Desalination), (*Desalination, *Evaporation), Evaporators, Heat transfer, Water supplies, Design, Thermodynamics, Corrosion, Economics, Costs, France.

The characteristics of a wall-less evaporation process is defined using the various factors involved in this evaporation: energy source, corrosion, furring, heat transfer, maximum temperature, etc. The unit considered in this work has a daily output of 100,000 cu. m and makes use of the multi-stage technique with an organic heat-carrier. The maximum temperature of the first stage is 150C and the evaporation factor is 0.4. After the description of the process and the calculation of the equipment, an economic estimate is given of the cost-price: 1.49 F/cu.m. It is likely that a more detailed study of the process (technique, equipment and energy consumed) should make it possible to obtain a significant improvement in the process and to reduce the price to 1 F/cu. m. (Author)

Y-1546 **Field 7A**
CFSTI Prices: HC$1.00 MF$0.50
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
HIGH-PRESSURE GAS MIXING FACILITY,
by J. L. Heatherly, and W. Garland. 8 Aug 66, 12p
Contract W-7405-eng-26

Descriptors: (*Chemical engineering, *High-pressure research).

For abstract, see N 20 20.

AD-639 659 **See Field 7D**

AD-640 368 **See Field 7D**

AD-640 386 **See Field 7D**

DP-1009 **See Field 7E**

ORNL-3977 **See Field 7B**

PB-170 916 **See Field 11B**

7B. INORGANIC CHEMISTRY

AD-470 763 **Field 7B**
CFSTI Prices: HC$1.60 MF$0.50
Directorate of Materials and Structures Research and Development (Gt. Brit.).
CAGE-LIKE SILICON COMPOUNDS,
by J. H. Bishop, and R. A. Shaw. Jul 65, 13p DMSRD-128
Prepared in cooperation with Birkbeck Coll., London (England).

Descriptors: (*Silicone plastics, Synthesis (Chemistry)), (*Silicon compounds, Polymers), (*Polymers, Silicon compounds), Molecular spectroscopy, Molecular structure, Bromine compounds, Oxygen compounds, Nuclear magnetic resonance, Chromatographic analysis, Bromination, Great Britain.

Identifiers: Silazanes.

The factors influencing the formation of octaisopropyloctasilsesquioxane have been investigated. This compound can be brominated by means of N-bromosuccinimide. Chemical evidence and n.m.r. spectroscopy show that bromination occurs in the alpha position of the isopropyl groups. Thin-layer chromatography provided a means of separating and identifying the individual components in brominated octaisopropyl T8 materials and column chromatography was used to isolate other oligomers. Some chemical reactions of the brominated derivatives and several investigations into the possibility of preparing a silazane 'cage' compound are described. (Author)

AD-639 857 **Field 7B**
Not available from CFSTI.
Illinois Inst. of Tech., Chicago. Dept. of Chemistry.
NORMAL COORDINATE ANALYSIS OF TRIGONAL BIPYRAMIDAL XY5 TYPE MOLECULES,
by Robert A. Condrate, and Kazuo Nakamoto. 12 Jul 65, 6p
Contract DA-31-124-ARO (D)-38
AROD-3899:7
Availability: Published in Bulletin of the Chemical Society of Japan v39 n6 p1108-13 1966.

Descriptors: (*Complex compounds, *Chemical bonds), Phosphorus compounds, Antimony compounds, Chlorides, Fluorides, Molecular association, Band spectrum.

Identifiers: Antimonic chloride, Antimonic fluoride, Phosphorus pentachloride, Phosphorus pentafluoride.

Normal coordinate analysis was carried out for trigonal bipyramidal XY5 molecules such as PF5, SbF5, PCl5 and SbCl5. It was found that the simple Urey-Bradley force field does not provide satisfactory results for the bending modes of these molecules. The results were improved considerably by introducing an interaction constant between equatorial and axial angle coordinates. In carrying out normal coordinate analysis, the repulsive force constants were first estimated from a Lennard-Jones type potential. Then the stretching and bending force constants were adjusted to fit the observed frequencies. Finally, the new interaction constant was introduced to minimize the errors in the bending frequencies. The force constants thus obtained are consistent through the four molecules studied. Some conflicting band assignments made by previous investigators are discussed on the basis of the present calculations. (Author)

AD-639 894 **Field 7B**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
A STUDY OF BORON HALIDE-PHOSPHORUS HALIDE COMPLEXES.
Physical sciences research papers,
by A. F. Armington, J. R. Weiner, and G. H. Moates. 13 Sep 65, 5p AFCRL-PSRP-217, AFCRL-66-237
Proj. AF-5620
Task 562004
Availability: Published in Inorganic Chemistry v5 p483 1966.

Descriptors: (*Complex compounds, Synthesis (Chemistry)), (*Boron compounds, Complex compounds), (*Phosphorus compounds, Complex compounds), Iodides, Bromides, Chlorides, Physical properties, Stability, Exchange reactions.

Identifiers: Boron tribromide, Boron trichloride, Boron triiodide, Phosphorus tribromide, Phosphorus trichloride, Phosphorus triiodide.

The methods of preparation of boron halide-phosphorus halide complexes are outlined, and some of the physical properties of these materials are discussed. Complexes involving boron iodide and boron bromide are relatively stable, while those involving boron trichloride are not. There is a tendency for the complexes involving phosphorus trichloride to undergo halogen exchange reactions. (Author)

AD-639 924 **Field 7B**
CFSTI Prices: HC$1.60 MF$0.50
Heidelberg Univ. (West Germany). Dept. of Inorganic Chemistry (1st).
PHOSPHORUS NITROGEN COMPOUNDS.
Technical note,
by Margot Becke-Goehring. 15 Nov 62, 13p TN-10
Contract AF 61 (052)-35

Descriptors: (*P-heterocyclic compounds, Synthesis (Chemistry)), (*N-heterocyclic compounds, Synthesis (Chemistry)), Chlorides, Nitrides, Amines, Chemical reactions, Nitrogen compounds, Phosphorus compounds, Polycyclic compounds, West Germany.

Identifiers: Phosphorus nitrides.

Trimeric phosphorus chloronitride as well as its diphenyl derivative react with aliphatic amines (chains ranging from 2-4 carbon atoms), giving 'Ansa' structures where the polymethylene amine groups are attached to two different P-atoms of this hexagonal ring system. (Author)

AD-639 925 **Field 7B**
CFSTI Prices: HC$1.60 MF$0.50
Heidelberg Univ. (West Germany). Dept. of Inorganic Chemistry (1st).
RESEARCH ON SULPHUR-PHOSPHOROUS-NITROGEN POLYMERS; THE HYDROLYSIS OF POLYMERIC PHOSPHOROUS NITRILIC CHLORIDE.
Technical scientific note,
by Margot Becke-Goehring. 31 Jan 59, 18p TN-2
Contract AF 61 (052)-35

Descriptors: (*Inorganic polymers, Phosphonitrile chlorides), (*Phosphonitrile chlorides, Hydrolysis), Synthesis (Chemistry), Decomposition, Amides, Imides, Phosphoric acids, Molecular structure, Salts, Esters, West Germany.

Identifiers: Amido polyimido phosphoric acids.

Topics include: preparation and separation of the phosphonitrilic chlorides; hydrolysis of oily phosphonitrilic chlorides; structure of the hydrolysis product; salts of the amido-polyimido-polyphosphoric acid; attempts to esterify the amido-polyimido-polyphosphoric acid.

AD-639 926 **Field 7B**
CFSTI Prices: HC$1.60 MF$0.50
Heidelberg Univ. (West Germany). Dept. of Inorganic Chemistry (1st).
RESEARCH ON PHOSPHORUS-NITROGEN POLYMERS.
Technical note,
by Margot Becke-Goehring. 15 Oct 60, 12p TN-7
Contract AF 61 (052)-35

Descriptors: (*Inorganic polymers, Synthesis (Chemistry)), (*Phosphonitrile chlorides, Synthesis (Chemistry)), (*Phosphorus compounds, Inorganic polymers), (*Nitrogen compounds, Inorganic polymers), Amides, Phosphoric acids, Chemical reactions, Hydrolysis, Sulfur compounds, Molecular structure, West Germany.

The synthesis of two new phosphoric nitride chlorides is reported, which are to be used as new starting materials for the research on phosphorus-nitrogen polymers. The compounds are Cl2P (N=PCl3)3 and Cl3PNP (O)Cl2.

AD-639 927 **Field 7B**
CFSTI Prices: HC$2.60 MF$0.50
Heidelberg Univ. (West Germany). Dept. of Inorganic Chemistry (1st).
RESEARCH ON PHOSPHOROUS-NITROGEN POLYMERS; SUBSTITUTION RULES ON TRIMERIC PHOSPHONITRILIC CHLORIDE.
Technical scientific note,
by Margot Becke-Goehring. 1 Oct 59, 27p TN-4
Contract AF 61 (052)-35

Descriptors: (*Inorganic polymers, Synthesis (Chemistry)), (*Phosphonitrile chlorides, Substitution reactions), (*Phosphorus compounds, Inorganic polymers), (*Nitrogen compounds, Inorganic polymers), N-heterocyclic compounds, P-heterocyclic compounds, Molecular isomerism, Nuclear magnetic resonance, Spectra (Infrared), West Germany.

The effect of nucleophilic reagents on the quasi-aromatic system of trimeric phosphonitrilic chloride and the mechanism of the substitution are investigated. 2, 3, 4, or 6 Cl atoms of (PNCl2)3 are easily substituted by nucleophilic ligands. Strongly nucleophilic reagents attack in 1- or 3- position. Further substitution follows in 5 position of the six membered ring system. With weak electron donors as reagents substitution takes place in another sequence. The substitution rules are checked by the synthesis of isomers. The nuclear magnetic resonance spectra are in agreement with the chemical reasoning. (Author)

AD-639 928 **Field 7B**
CFSTI Prices: HC$1.60 MF$0.50
Heidelberg Univ. (West Germany). Dept. of Inorganic Chemistry (1st).
RESEARCH ON PHOSPHORUS-NITROGEN-POLYMERS; SUBSTITUTION-RULES ON TRIMERIC PHOSPHONITRILIC CHLORIDE.
Technical scientific note,
by Margot Becke-Goehring. 1 Nov 59, 20p TN-5
Contract AF 61 (052)-35

Descriptors: (*Inorganic polymers, Synthesis (Chemistry)), (*Phosphonitrile chlorides, Substitution reactions), (*Phosphorus compounds, Inorganic polymers), (*Nitrogen compounds, Inorganic polymers), N-heterocyclic compounds, P-heterocyclic compounds, Aromatic compounds, Polycyclic compounds, Amines, Condensation reactions, Nuclear Magnetic resonance, West Germany.

Identifiers: Diphenyl amino triphosphonitriles.

The diphenyl derivative is easily obtained by the reaction of trimeric phosphonitrilic chloride with AlCl3 in benzene. The two phenylgroups are attached to the same P atom. This compound can be converted into a di- or tetramino compound by reaction with ammonia; the latter compound was obtained in two different modifications. The ammonia attacks first in the 3 and 5 positions, leading to a product in which the aminogroups are attached to different P atoms. Further attack on the disubstituted compound leads to tetrasubstituted diphenyl derivatives. Condensation of the amino compounds can be effected by splitting out ammonia. The NMR spectra confirms the postulated structures. (Author)

AD-639 929 **Field 7B**
CFSTI Prices: HC$1.60 MF$0.50
Heidelberg Univ. (West Germany). Dept. of Inorganic Chemistry (1st).
RESEARCH ON PHOSPHORUS-NITROGEN-SILICON COMPOUNDS.
Technical scientific note,
by Margot Becke-Goehring. 15 Nov 59, 14p TN-6
Contract AF 61 (052)-35

Descriptors: (*Inorganic polymers, Synthesis (Chemistry)), (*Phosphorus compounds, Inorganic polymers), (*Nitrogen compounds, Inorganic polymers), (*Silicon compounds, Inorganic polymers), Amides, Hydrazine derivatives, Phosphoric acids, Silanes, Esters, Chlorides, West Germany.

The reactions of hexamethyldisilazane and trimethyl-N-methyl-aminosilane with amides and hydrazides of esters of phosphoric acid result in heterolysis of Si-N-compounds and trimethylsilyl-amides or -hydrazides of the corresponding phosphoric acid are formed. Monochlorides of esters of phospheric acid also react with hexamethyldisilazane under heterocyclic fission of the Si-N-compound, while the reaction of trimethyl-N-methylamino-silane results in the substitution of the H-atom attached to the N-atom without any fission of the Si-N-compound. Derivates of the dichlorophospheric acid are obtained from silazane and OPCl3. (Author)

AD-639 930 **Field 7B**
CFSTI Prices: HC$2.60 MF$0.50
Heidelberg Univ. (West Germany). Dept. of Inorganic Chemistry (1st).
RESEARCH ON PHOSPHORUS-NITROGEN COMPOUNDS.
Technical note,
by Margot Becke-Goehring. 31 Jan 62, 27p TN-9
Contract AF 61 (052)-35

Descriptors: (*Phosphorus compounds, Molecular structure), (*Nitrogen compounds, Molecular structure), (*Phosphonitrile chlorides, Chemical reactions), Nuclear magnetic resonance, Chlorides, Band spectrum, Intensity, Salts, Inorganic polymers, West Germany.

The structures of the compounds P3NCl12, P2NCl7, P3N2OCl2 and P4N3OCl9 were elucidated with the assistance of nuclear magnetic resonance spectra. These spectra are of the type A2, AB2, ABX and AX2Y an their analysis enabled the determination of the chemical shifts of the phosphorus nuclei and of their coupling constants with neighbouring nuclei in these compounds. The observed spectra are compared with computed spectra for the corresponding cases. The reaction of phosphorus nitrilic chlorides with phosphorus pentychloride yields salt-type substances having as cations (C13P=N- (PC12N)x-PC13) (+) and as anions (PCl6) (-), where x = 0. Definitive chain lengths are preferentially formed, according to the selected mixing ratio of the starting components. (Author)

AD-639 931 **Field 7B**
CFSTI Prices: HC$2.60 MF$0.50
Heidelberg Univ. (West Germany). Dept. of Inorganic Chemistry (1st).
RESEARCH ON PHOSPHORUS-NITROGEN COMPOUNDS.
Technical note,
by Margot Becke-Goehring. 15 Apr 61, 30p TN-8
Contract AF 61 (052)-35

Descriptors: (*Phosphorus compounds, Chemical reactions), (*Nitrogen compounds, Chemical reactions), Phosphoric acids, Amides, Chemical reactions, Phosphonitrile chlorides, Synthesis (Chemistry), Nuclear magnetic resonance, Molecular structure, Chemical bonds, Electrical conductance, West Germany.

Identifiers: Dichlorophosphenyl phosphorimidic trichloride, Trichloro ((Trichloro phosphoranylidene) Amino) Phosphorus hexachlorophosphate.

Phosphoric acid amides with PCl5 as well as hydroxyl ammonium salts with PCl5 (or with PCl3) lead to the compound Cl3P=N-P (O)Cl2, which is also formed in the reaction between PCl3 and N2O4. The nuclear magnetic resonance spectrum of this compound was studied. The phosphorus atoms in the compound possess the coordination number 4 and are chemically equivalent. The two phosphorus atoms are connected by a nitrogen bridge and a coupling constant of 15,4 c.p.s. was measured. The reactions of PCl5 with NH4Cl in solvents of not too low dielectric constant leads in good yield to P3NCl12, a compound whose constitutions was elucidated through chemical reactions, measurement of electrical conductivity and study of the nuclear magnetic resonance spectrum. (Author)

AD-639 932 **Field 7B**
CFSTI Prices: HC$1.60 MF$0.50
Heidelberg Univ. (West Germany). Dept. of Inorganic Chemistry (1st).
THE REACTION BETWEEN PHOSPHORUS PENTOXIDE AND AMMONIA.
Technical scientific note,
by Margot Becke-Goehring. 22 Oct 58, 13p TN-1
Contract AF 61 (052)-35

Descriptors: (*Inorganic polymers, Synthesis (Chemistry)), (*Phosphorus compounds, Chemical reactions), (*Ammonia, Chemical reactions), (*Nitrogen compounds, Inorganic polymers), Phosphoric acids, Condensation reactions, Molecular structure, West Germany.

Identifiers: Phosphorus pentoxide.

The reaction of P4O10 with NH3 proceeds by cleavage of the P4O10 molecule. The main products are derivatives of di-phosphoric acid, which can be condensed at about 100C, yielding an ammonium salt of polyphosphoric acid in which one half of the P-atoms are connected by O-bridges, the other half by NH-linkages. (Author)

AD-639 933 **Field 7B**
CFSTI Prices: HC$1.60 MF$0.50
Heidelberg Univ. (West Germany). Dept. of Inorganic Chemistry (1st).
RESEARCH ON SULFUR-PHOSPHORUS-NITROGEN POLYMERS; ON SULFUR-NITROGEN-SILICON-COMPOUNDS.
Technical scientific note,
by Margot Becke-Goehring. 31 Jan 59, 18p TN-1
Contract AF 61 (052)-35

Descriptors: (*Inorganic polymers, Synthesis (Chemistry)), (*Sulfur compounds, Synthesis (Chemistry)), (*Nitrogen compounds, Synthesis (Chemistry)), (*Silicon compounds, Synthesis (Chemistry)), Chemical bonds, Silanes, Chemical reactions, Sulfonic acids, Esters, Amides, West Germany.

The bonds between Si and N in hexamethyldisilazan and trimethyl-N-methyl-aminosilane readily undergo heterolytic fission. Using one such reaction, various derivatives were prepared in which one or two Si atoms are bonded with sulphuryl groups, SO2, through HN bridges or through a CH3N bridge, or, resp. through a (CH3)3Si-N bridge. When two HN bridges are present, one may be replaced by O. (Author)

AD-639 998 **Field 7B**
Not available from CFSTI.
Rohm and Haas Co., Huntsville, Ala. Redstone Arsenal Research Div.
THE FLUORO-O-FLUOROSULFATOMETHANES.
by Max Lustig. 25 Jun 65, 4p
Contract DA-01-021-AMC-11536 (Z)
Availability: Published in Inorganic Chemistry v4 p1828-30 1965.

Descriptors: (*Fluorine compounds, *Methane), (*Sulfur compounds, Methane), Synthesis (Chemistry), Spectra (Infrared), Nuclear magnetic resonance.

Identifiers: Fluoro fluorosulfato methanes.

The new compounds difluorobis (O-fluorosulfato)-methane, F2C (OSO2F)2, and fluorotris (O-fluorosulfato)-methane, FC (OSO2F)3, were prepared by the reaction of peroxydisulfuryl difluoride, S2O6F2, with dibromodifluoro- and tribromofluoromethane, respectively. The fluoropoly (O-fluorosulfato)methanes are the first examples of compounds containing more than one O-fluorosulfate group attached to a single carbon atom. A similar reaction employing CBr4 did not yield the tetrakis compound, but, rather, a compound tentatively identified as O=C (OSO2F)2. (Author)

AD-640 437 **Field 7B, 11C**
CFSTI Prices: HC$2.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
A RADIOCHEMICAL INVESTIGATION OF THE LEACHING OF CHROMIUM FROM CHEMICALLY CHROMATED ALUMINUM SURFACES.
by A. L. Glass. 19 Jul 66, 28p NAEC-AML-2478
Task RRMA-04-011/200-1/R007-10-01

Descriptors: (*Chromates, Decomposition), (*Chromium, Solubility), (*Aluminum alloys, Protective treatments), Tracer studies, Films.

A reproducible and accurate radioactive tracer procedure using the isotope chromium-51 has been developed to measure the 'leaching' rates, in situ, of chromium from chemically chromated aluminum surfaces. Studies of the rates of solution are reported and an interpretation of these results is presented. (Author)

AD-640 496 **Field 7B**
CFSTI Prices: HC$2.00 MF$0.50
Colorado Univ., Boulder.
COORDINATION CHEMISTRY OF THE GROUPS IV AND V METALS.
Rept. for 1 Mar 62-1 Mar 66,
by R. N. Keller. May 66, 31p
Contract AF 33 (657)-8321
Proj. AF-7023
ARL-66-0082

Descriptors: (*Complex compounds, Synthesis (Chemistry)), (*Vanadium compounds, Complex compounds), Oxides, Acids, Molecular association, Niobium compounds, Fluorine compounds, Tantalum compounds, Amides.

It was shown that vanadium (V) (as V2O5) can be reduced to vanadium (IV) at 80-100C, with any of the following substances: glycolic, lactic, tartaric, formic, citric, oxalic, and malonic acids; amino acids such as ethylenediaminetetracetic acid, 2-hydroxyethyliminodiacetic acid, methyliminodiacetic acid, nitrilotriacetic acid, and glycine; and hydroxy compounds such as ethylene, propylene glycol, glycerine, and catechol. Most of the reducing agents subsequently react with the vanadium (IV) to form characteristic complexes. The use of V205 has the advantage of allowing the reaction to proceed smoothly and facilitating the preparation of certain complexes containing free carboxyl groups which would be difficult to prepare in any other way. Some of these complexes when dissolved in water titrate as though they are mono- or diprotic acids. Exhaustive efforts in both aqueous and non-aqueous solutions to prepare derivatives of the octafluoroniobate (V) ion failed. Attempts were inconclusive to prepare complexes of niobium (V) and tantalum (V) containing the ion MXn (- (n-5)) (where X is a halogen other than fluorine), and compounds containing a diamide chelating group such as (-) HNCH2CH2NH (-). (Author)

HW-82771 **Field 7B, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
RECOVERY OF ALUMINUM NITRATE NONAHYDRATE FROM REDOX ACID WASTE. PART 3, MATHEMATICAL DESCRIPTION,
by W. L. Godfrey, R. Y. Dean, and J. C. Stouffer. Dec 65, 33p
Contract AT (45-1)-1350

Descriptors: (*Mathematical models, *Solvent extraction).

For abstract, see N 20 20.

N66-27049 **Field 7B**
CFSTI Prices HC$2.00 MF$0.50
Southwest Research Inst., San Antonio, Tex.
ANALYSIS OF NITROGEN TETROXIDE SAMPLES FINAL REPORT.
by H. C. Mc kee, and W. A. Mc mahon. 15 Apr 66, 31p NASA-CR-65372
Contract NAS9-5422

Descriptors: *Chemical analysis, *Mass spectrometry, *Nitric oxide, *Nitrogen oxide, Alloy, Analysis, Chemical, Corrosion, Impurity, Mass, Measurement, Nitric, Nitrogen, Oxide, Spectrometry, Stress, Tank, Tetroxide, Titanium, Trace.

For abstract, see S 04 15.

N66-28233 **Field 7B**
CFSTI Prices HC$1.00 MF$0.50
Osterreichische Studiengesellschaft Fur Atomenergie G.m.b.h., Seibersdorf (Austria).
A CONTRIBUTION TO QUANTITATIVE ACTIVATION PURITY DETERMINATION OF RARE EARTH OXIDES.
Ein Beitrag Zur Quantitativen Aktivierungsanalytischen
Reinheitsbestimmung Von Seltenerdoxyden
by H. Auer-welsbach, H. Bildstein, and H. Manhartsberger. 1966, 15p SGAE-CH-27/1966
In German Submitted For Publication

Descriptors: *Quantitative analysis, *Rare earth compound, Activation, Ammonium, Analysis, Cation, Compound, Determination, Earth, Europium, Exchanger, Gadolinium, Lutetium, Neodymium, Oxide, Praseodymium, Purity, Quantity, Rare, Separation, Tracer, Ytterbium.

For abstract, see S 04 15.

N66-28368 **Field 7B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
IONIZATION OF CHLORINE AND IODINE IN FUSED SALTS..
Ionizatsiya Khlora I Yoda V Rasplavlennykh Solyakh
by S. R. Borisova, and G. N. Trusov. May 66, 16p NASA-TT-F-10158
Transl. Into English From Elektrokhimiya (Ussr), V. 1, No. 6, 1965 P 709-713

Descriptors: *Chlorine, *Iodine, *Ionization, Carbon, Cell, Current, Diffusion, Electrode, Fuse, Graphite, Heat, High temperature, Increase, Layer, Reaction, Salt, Thin, Tungsten.

For abstract, see S 04 15.

N66-29335 **Field 7B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INFRARED REFLECTIVITY OF SOME COMMON MINERALS.
by W. A. Hovis Jr. 1965, 24p NASA-TM-X-56482
Submitted For Publication

Descriptors: *Carbonate, *Infrared reflection, *Nitrate, *Silicate, *Sulfate, Absorption, Atmosphere, Infrared, Mineral, Planet, Reflection, Spectrum, Wavelength.

For abstract, see S 04 16.

N66-29408 **Field 7B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
USE OF CARBON DIOXIDE TO CALIBRATE INSTRUMENTS FOR DETERMINATION OF CARBON BELOW 50 PARTS PER MILLION IN METALS.
by J. W. Graab, and E. J. Merkle. 1965, 9p NASA-TM-X-56717
Submitted For Publication

Descriptors: *Calibration, *Carbon, *Carbon dioxide, *Chemical analysis, *Chromatography, Acid, Analysis, Analyzer, Chemical, Determination, Instrument, Metal, Phthalate, Potassium.

For abstract, see S 04 16.

N66-29755 **Field 7B**
CFSTI Prices HC$1.00 MF$0.50
Idaho State Univ., Pocatello. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena. Dept. Of Chemistry.
THE REACTIONS PERTAINING TO ZINC-SILVER AND CADMIUM-SILVER BATTERIES FIRST QUARTERLY REPORT.
by G. M. Arcand. 17 May 66, 20p NASA-CR-76047
Contracts NAS7-100, JPL-951458
Prepared For Jpl

Descriptors: *Battery, *Electrochemistry, *Silver oxide, *Thermogravimetry, *Zinc, Ammonia, Analysis, Anode, Cadmium, Cathode, Chemistry, Electrode, Hydroxide, Inorganic, Oxide, Potassium, Precipitation, Silver.

For abstract, see S 04 16.

N66-29762 **Field 7B**
CFSTI Prices HC$1.00 MF$0.50
Sperry Rand Research Center, Sudbury, Mass.
DEVELOPMENT OF CHEMICAL ANALYSIS TECHNIQUES FOR ADVANCED MATERIALS RESEARCH PROGRAM THIRD QUARTERLY PROGRESS REPORT, JUN. 1 - AUG. 31, 1965.
by F. D. Leipziger. 1965, 17p NASA-CR-76030, SRRC-RR-65-79
Contracts NAS7-100, JPL-950992
Prepared For Jpl

Descriptors: *Chemical analysis, *Impurity, *Magnesium oxide, *Mass spectroscopy, *Powdered metal, Analysis, Chemical, Contamination, Magnesium, Mass, Material, Metal, Oxide, Powder, Science, Spectrography, Spectroscopy.

For abstract, see S 04 16.

N66-36063 **Field 7B**
CFSTI Prices HC$2.00 MF$0.50
General Dynamics Corp., San Diego, Calif. John Jay Hopkins Lab. For Pure And Applied
ABUNDANCES OF TRACE ELEMENTS NA, SC, CR, MN, FE, CO, AND CU IN CHONDRULES AND METEORITES IN IN METEORITES AND TERRESTRIAL MATTER AND U IN TYPE I CARBONACEOUS CHONDRITES QUARTERLY PROGRESS REPORT, 1 MAR. - 15 JUN. 1966.
by R. A. Schmitt. 15 Jul 66, 41p NASA-CR-77809, GA-7223
Contract NASW-843

Descriptors: *Chondrite, *Element abundance, *Meteorite, *Neutron activation, Abundance, Activation, Analysis, Beta, Carbonaceous, Chondrule, Chromium, Copper, Counting, Gamma, Indium, Iron, Manganese, Neutron, Radiation, Scandium, Sodium, Table, Trace, Uranium.

For abstract, see S 04 21.

ORNL-3977 **Field 7B, 7A**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
OXIDATION AND CHLORINATION OF UO2-PUO2,
by K. S. Warren, and L. M. Ferris. Jul 66, 29p
Contract W-7405-eng-26

Descriptors: (*Uranium compounds, Dioxides).

For abstract, see N 20 19.

PB-170 914 **Field 7B**
CFSTI Prices: HC$4.60 MF$0.50
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
CONTRIBUTION A L'ETUDE ANALYTIQUE DES FERRATES (Contribution to the Analytic Study of Ferrates).
Doctoral thesis in French.
by Nicole Becarud. 1966, 48p CEA-R-2895
Text in French; Attached Summary in English.

Descriptors: (*Ferrates, Chemical analysis), (*Potassium compounds, Ferrates), (*Strontium compounds, Ferrates), (*Barium compounds, Ferrates), Chromatographic analysis, Electrochemistry, Spectra (Infrared), Polarographic analysis, Thermal stability, Differential thermal analysis, France.

Identifiers: Barium ferrate, Potassium ferrate, Strontium ferrate.

Preparation and chemical properties of potassium, strontium and barium ferrates are described. Separation by glass-paper chromatography, electrochemical studies and infrared spectra are shown. A polarographic determination of ferrate ion was worked. The stability of these compounds is studied with differential thermal analysis. (Author)

PB-170 932 **Field 7B, 7D**
CFSTI Prices: HC$7.60 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
LA CHRONOAMPEROMETRIE LINEAIRE PAR REDISSOLUTION APPLICATION AUX HALOGENURES (Linear Chrono-Amperometry Using Redissolution Application to Halides),
by Jean-Pierre Perchard, Micheline Buvet, and Roger Molina. 1966, 77p CEA-R-3030
Text in French; Attached Summary in English.

Descriptors: (*Halides, Chemical analysis), (*Chlorides, Chemical analysis), (*Bromides, Chemical analysis), (*Iodides, Chemical analysis), Electrochemistry, Electrodes, Mercury, Reduction (Chemistry), Mercury alloys, Oxidation, Sensitivity, Concentration (Chemistry), Solutions, Monomolecular films, France.

Identifiers: Chronoamperometric analysis.

The possibility of applying linear chrono-amperometry to analysis was studied using a falling-drop mercury electrode. The measurement of the cations was carried out by direct reduction or by prior formation of an amalgam which is then oxidised. Halides are determined by redissolving the mercurous halide deposit which is previously formed by electrolysis. From the analytical point of view, the sensitivity is limited in the domain where the phenomena can be interpreted and made used of. In the case of the chloride ion the lower limit of this zone is close to 0.00001 M; it is 0.000001 M for the bromide and less than 10 to the -7th power M for the iodide. For lower concentrations, the simple laws which might be applied in analysis are no longer valid. However the splitting of the peak which is observed during the reduction of the mercurous iodide deposit is interpreted as showing that the mono-molecular Hg_2I_2 layer formed on the drop has particular electro-chemical properties. (Author)

AD-457 269 See Field 7C

AD-473 931 See Field 8J

AD-639 646 See Field 11G

AD-639 685 See Field 7C

AD-639 701 See Field 7E

AD-639 840 See Field 6E

AD-640 140 See Field 7D

AD-640 192 See Field 20B

AD-640 302 See Field 7D

AD-640 473 See Field 7D

AD-640 514 See Field 20L

LA-3503 See Field 7D

PB-169 614 See Field 7E

PB-170 926 See Field 7E

PB-170 930 See Field 7E

PB-172 455 See Field 13B

PB-173 178 See Field 7D

7C. ORGANIC CHEMISTRY

AD-457 269 **Field 7C, 7B**
CFSTI Price: HC$1.60
Royal Aircraft Establishment, Farnborough (England).
NOTES ON THE 148TH AMERICAN CHEMICAL SOCIETY MEETING CHICAGO, ILLINOIS, AUG. 30-SEPT. 4, 1964,
by J. Thrower. Sep 64, 19p Technical rept. TR-64020

Descriptors: (*Scientific organizations, Chemistry), (*Symposia, Chemistry), Fluorine compounds, Reviews, Inorganic compounds, Organic compounds, Great Britain.

Two papers from the R. A. E. were presented to the 148th meeting of the American Chemical Society. The author attended the symposium of the new Division of Fluorine Chemistry, and some of the 60 papers from the latter are briefly reviewed. (Author)

AD-457 282 **Field 7C**
CFSTI Price: HC$1.60
Royal Aircraft Establishment, Farnborough (England).
THE THERMAL DECOMPOSITION OF 1,4-BIS (PENTAFLUOROPHENYLTHIO) TETRAFLUORO BENZENE,
by J. L. Cotter. Nov 64, 12p Technical rept. TR-64065

Descriptors: (*Aromatic compounds, Pyrolysis), (*Pyrolysis, Fluorine compounds), (*Polycyclic compounds, Organic sulfur compounds), Reaction kinetics, Mass spectroscopy, Spectra (Infrared), Diphenyl, Chemical bonds, Carbon, Sulfur, Sulfides.

The major products of pyrolysis of 1,4-bis (pentafluorophenylthio) tetrafluoro benzene at 500 degrees in vacuum are bis (pentafluorophenyl) sulphide and an involatile solid which is probably a perfluoropolyphenylene sulphide. Much smaller amounts of perfluorobiphenyl and hexafluorobenzene are also formed. Tentative reaction schemes are proposed to account for the formation of these products. (Author)

AD-463 205 **Field 7C, 11J**
CFSTI Price: HC$1.60
Royal Aircraft Establishment, Farnborough (England).
THE CROSS-LINKING OF METHYL-VINYL SILICONES WITH ORGANIC PEROXIDES,
by D. K. Thomas. Jan 65, 20p Technical rept. TR-65007

Descriptors: (*Peroxides, Organic compounds), (*Silicone plastics, Synthetic rubber), (*Vulcanizates, Stability), Mechanical properties, Thermal properties, Chemical bonds, Heat, Aging (Materials), Stresses, Great Britain.

Identifiers: Dimethylbutyl peroxyhexanes, Methyl vinyl silicones.

A study of the cross-linking efficiency of selected organic peroxides in silicone gum and of the mechanical properties, heat stability, and processing of the resulting vulcanisates indicates that 2,5-dimethyl 2,5-ditertiary butyl peroxy hexane is to be preferred to the dichlorobenzoyl peroxide normally used. Vulcanisates produced with this peroxide give a better all around level of properties with a much more economical cure cycle, and there are indications that substantially improved heat aging properties could be obtained if a suitable alternative to fine silica as a reinforcing filler could be found. (Author)

AD-477 806 **Field 7C, 11I**
CFSTI Prices: HC$3.60 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
INITIAL EVALUATION OF DIPHENYL OXIDE RESINS.
Technical rept.,
by L. N. Phillips, B. Nixon, and Jennifer A. Woolmington. Oct 65, 39p TR-65220

Descriptors: (*Phenyl ethers, Thermosetting plastics), Friedel-Crafts reactions, Synthesis, Laminates, Aluminum compounds, Silicates, Polymers, Amines, Thermal stability, Reinforcing materials, Electrical properties, Mechanical properties, Chemical properties, Great Britain, Density, Spectrophotometers, Manufacturing methods, Theory, Xylenes, Aging (Materials).

Diphenyl oxide was shown to condense readily with p-xylylene dichloride under mild conditions to give soluble, fusible thermosetting resins. These have been used to make laminates with a variety of reinforcing fibres, of which chrysotile asbestos and aluminum silicate were the most satisfactory. Long term heat-aging tests on chrysotile asbestos laminates showed a thermal stability similar to that of analogous Friedal-Crafts resins based on terphenyl, but with better initial hot-strength than the latter. The hydrolytic stability of diphenyl oxide based materials was good, but the resistance to concentrated acid and alkali was relatively poor. A new series of Friedal-Crafts polymers (Mark 2) was discovered based on the aromatic methoxymethyl derivative. These cure more slowly than resins made from the corresponding dichloromethyl compound. The Mark 2 resins appear to have application in the field of insulation both as impregnating media and as thermosetting moulding compounds. (Author)

AD-477 989 **Field 7C**
CFSTI Prices: HC$2.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
ATTEMPTS TO PREPARE FLUOROETHERS WITH EMPHASIS ON THE USE OF LITHIO-PERFLUOROALKANES IN ORGANIC SYNTHESIS,
by Peter Johncock. Nov 65, 42p Technical rept. TR-65245

Descriptors: (*Fluorine compounds, Synthesis (Chemistry)), Feasibility studies, Polymers, Ethers, Elastomers, Alkanes, Metalorganic compounds, Lithium compounds, Spectra (Infrared), Carboxylic acids, Salts, Octanoic acids, Fatty acids, Butane, Great Britain.

In the search for new elastomers suitable for use at high temperatures, certain aliphatic poly (fluoroethers) appear promising candidates for the base polymer. Attempts made to prepare as a model (bis- (1-1-di-H-heptafluorobutyl) ether, by potential polymer forming reactions, were unsuccessful: perfluoro-n-propyl-lithium was insufficiently stable to undergo condensation with symdichlorodimethyl ether, and O-alkylation of 1-1-di-H-heptafluorobutyl trifluoromethane- sulphonate with sodium 1-1-di-H-heptafluorobutoxide could not be effected. Perfluoro-n-heptyl-lithium and 1-4-dilithio-octafluorobutane were prepared by halogen-metal exchange and characterised by their reactions with acetaldehyde: they are much less stable than perfluoro-n-propyl-lithium. The proportion of alkyl-lithium compound used for the exchange had a considerable effect on the stability of the fluoro-organometallic reagent. Perfluoro-n-propyl-, perfluoroisopropyl-, and perfluoro-n-heptyl-lithium could be carboxylated at low temperature. (Author)

AD-482 530 **Field 7C, 11I**
CFSTI Prices: HC$3.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
THE PREPARATION AND FABRICATION OF AROMATIC POLYIMIDES,
by R. A. Dine-Hart. Oct 65, 53p Technical rept. TR-65228

Descriptors: (*Imides, Polymerization), (*Polyamide plastics, Synthesis (Chemistry)), Carboxylic acids, Anhydrides, Benzenes, Amines, Molecular weight, Tensile properties, Mechanical properties, Films, Amino plastics, Molding materials, Degradation, Reaction kinetics, Great Britain, X-ray diffraction analysis, Temperature, Concentration (Chemistry), Molding, Molecular properties, Hydrolysis, Casting, Thermal stability.

Aromatic polyimides have been prepared from pyromellitic dianhydride and a range of aromatic diamines. The effect of a number of variables on the polymerisation to, and the degradation of the intermediate polypyromellitamic acids has been studied, and a previously unrecorded reaction intermediate has been isolated and identified. From these studies the conditions necessary to obtain high molecular weights have been defined. Mechanically strong films and mouldings have been obtained where permitted by the diamine component. (Author)

AD-482 738 **Field 7C**
CFSTI Prices: HC$1.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
FLUOROAROMATIC POLYMERS. PERFLUORO-META-POLYPHENYLENES.
Technical rept.,
by J. Thrower, and Mary A. White. Feb 66, 22p TR-66031

Descriptors: (*Fluorine compounds, Synthesis (Chemistry)), (*Benzenes, Fluorine compounds), (*Polymers, Spectra (Infrared)), Thermal stability, Heat-resistant materials, Molecular weight, Hydrocarbons, Plastics, Oxidation, Physical properties, Bromides, Chlorides, Iodides, Melting, Mass spectrum, Spectra (Visible + ultraviolet), Great Britain.

Identifiers: Dimethyl formamide.

The Ullmann reaction in dimethylformamide has proved very successful for the synthesis of perfluoro-meta-polyphenylenes. Properties of model compounds and polymers described include general physical characteristics as well as thermal and thermal oxidative stability. Infrared, ultraviolet and mass spectra are briefly discussed. (Author)

AD-483 067 **Field 7C, 11I**
CFSTI Prices: HC$3.60 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
THE RATIO OF THE GLASS TEMPERATURE TO THE MELTING POINT IN POLYMERS.
Technical rept.,
by W. A. Lee, and G. J. Knight. Jan 66, 38p TR-66005

Descriptors: (*Plastics, Melting point), (*Melting point, Transition temperature), Polyethylene plastics, Vinyl plastics, Butadienes, Fluorine compounds, Styrene plastics, Polyester plastics, Epoxy plastics, Isocyanate plastics, Polymers, Polyamide plastics, Nylon, Physical properties, Molecular structure, Carbonates, Esters, Acrylic resins, Phenolic plastics, Anhydrides, Carboxylic acids, Phthalates, Great Britain.

A study of the ratio of the glass temperature to the melting point of 138 polymers is described. Contrary to some other workers' observations on smaller numbers of polymers, the ratio is found to vary widely between 0.5 and 0.8 and 20% of polymers have ratios outside this range. There is no basis for distinguishing between symmetrical and unsymmetrical polymers or between their crystalline forms. It is suggested that this result is not wholly unexpected. (Author)

AD-639 685 **Field 7C, 7D, 7B**
CFSTI Prices: HC$2.00 MF$0.50
Texas Technological Coll., Lubbock. Dept. of Chemistry.
MOLECULAR RESEARCH. I. THE REACTIONS OF AROMATIC SULFIDES AND SULFOXIDES. II. THE THERMAL DISSOCIATION OF COORDINATION COMPOUNDS. III. A RESEARCH DISPLAY.
Final rept. 1 Aug 62-31 Jan 66,
by H. J. Shine, and W. W. Wendlandt. 1966, 46p
Grant AF-AFOSR-23-63
Proj. AF-9760
Task 976001
AFOSR-66-1932

Descriptors: (*Organic sulfur compounds, Chemical reactions), (*Complex compounds, Pyrolysis), (*Display systems, Chemistry), Sulfides, Sulfoxides, Oxidation, Aromatic compounds, Free radicals, Electron spin resonance, S-heterocyclic compounds, Calorimetry, X-ray diffraction analysis, Spectroscopy, Oxalates, Photolysis.

The conversion of aromatic sulfides to cation radicals and dications in oxidizing media (principally sulfuric acid) was studied. The structures of the radicals were determined by electron spin resonance spectroscopy. Aromatic sulfoxides in strong acids are converted to the same cation radicals and dications as obtained from the corresponding sulfides. At the same time the aryl rings of the sulfoxide may become hydroxylated. The mechanisms of these reactions have been studied with particular emphasis on heterocyclic compounds such as thianthrene, phenothiazine, phenoxathiin, thioxanthene, and their oxides. The thermal dissociation of a large number of coordination compounds was investigated using the thermal techniques of TGA, DTA, MSA, TMA, X-ray diffraction, and so on. New thermal techniques, such as dynamic reflectance spectroscopy and others, are also described. The photolysis of certain oxalato complexes is also reported. A new type of reaction, 'thermal matrix reactions', is described and its application to difficult synthetic problems discussed. A four-panel automated research display was fabricated. (Author)

AD-639 936 **Field 7C**
CFSTI Prices: HC$3.60 MF$0.50
Sheffield Univ. (England). Dept. of Chemistry.
A STUDY OF THE HALOGENATION OF ALIPHATIC HYDROCARBONS AND DERIVATIVES THEREOF. PART II.
Technical note,
by J. M. Tedder, and P. S. Fredricks. 1959, 35p TN-2
Contract AF 61 (052)-63
See also AD-639 937.

Descriptors: (*Halogenated hydrocarbons, Synthesis (Chemistry)), (*Aliphatic compounds, Halogenation), Chlorides, Fluorides, Bromides, Chlorination, Fluorination, Bromination, Spectra (Infrared), Free radicals, Stereochemistry, Great Britain.

Identifiers: Butyl bromides, Butyl chlorides, Butyl fluorides.

The investigation of the halogenation of the n-butyl halides was extended. The chlorination of n-butyl chloride and n-butyl fluoride was studied at new temperatures; and the fluorination of n-butyl fluoride, reported previously, was repeated to enable the relative rate of attack on the substituted carbon atom to be estimated using mass-spectra. The bromination of n-butyl chloride, fluoride and bromide was studied. The results fall into line with those previously reported and enable some generalisations to be made about hydrogen abstraction reactions in general. To support these deductions the chlorination of n-hexane, n-amyl chloride, n-amyl and n-hexyl fluorides was studied. A start was made in the study of the halogenation of the secondary butyl halides. These include the chlorination of sec-butyl chloride and fluoride, and the fluorination of secondary butyl fluoride. The results obtained are in very good accord with the generalisations drawn up on the basis of the previous work. An interesting observation made during the course of this work was the stereospecificity of the reaction of CH3CH CHX CH3 radicals with halogen molecules. (Author)

AD-639 937 **Field 7C**
CFSTI Prices: HC$1.00 MF$0.50
Sheffield Univ. (England). Dept. of Chemistry.
A STUDY OF THE HALOGENATION OF ALIPHATIC HYDROCARBONS AND DERIVATIVES THEREOF.
Technical note.,
by J. M. Tedder, and P. S. Fredricks. 1959, 20p
Contract AF 61 (052)-63

Descriptors: (*Halogenated hydrocarbons, Synthesis (Chemistry)), (*Aliphatic compounds, Halogenation), Chlorides, Bromides, Fluorides, Chlorination, Fluorination, Butane, Gas chromatography, Great Britain.

Identifiers: Butyl bromides, Butyl chlorides, Butyl fluorides.

The halogenation of the n-butyl halides in the gas phase was investigated. To date the fluorination of n-butyl fluoride and the chlorination of n butyl fluoride, chloride and bromide were investigated. It is hoped to extend these investigations to include a study of the bromination of these compounds under similar conditions. The results obtained so far indicate that the effect of the halogen already present in the organic molecule is to retard substitution at the (beta-carbon atom, the effectiveness of the halogens being the order F > Cl > (Br); there is some evidence that fluorine may deactivate the gamma-position slightly. At present it has only been possible to obtain precise data about substitution at the alpha-carbon atom in chlorination, which is slightly retarded at this position, the effectiveness of the substituent halogens in deactivation being Br > Cl approx. = F. The selectivity of the attacking atoms is Cl > F but they appear to be affected to a different extent by the substituent halogen. Thus fluorination, while remaining far less selective than chlorination, appears to be more affected by the substituent halogen. Some preliminary studies on the effect of other substituents than the halogens were made. (Author)

AD-639 938 **Field 7C**
CFSTI Prices: HC$3.60 MF$0.50
Leicester Univ. (England).
THE CHEMICAL REACTIVITY OF THE ARYL-SILICON BOND.
Final technical rept. 15 Sep 58-14 Sep 61,
by C. Eaborn. 1961, 32p
Contract AF 61 (052)-64

Descriptors: (*Silanes, Chemical reactions), Chemical bonds, Decomposition, Ethers, Stereochemistry, Reaction kinetics, Great Britain.

Identifiers: Phenyl silanes.

A study was made of the effect of varying the non-cleaved groups, R1, on the rate of cleavage of p-methoxyphenyltriorgansilanes, p-MeO.C6H4. S1R3, by aqueous methanolic perchloric acid. With triphenyl-p-methoxyphenyl-silanes, (m- or p-X.C6H4)3 SiC6H4.OMe-p, electron-releasing substituents facilitate and electron-withdrawing groups retard reaction; the effects are small, and in accord with the beta-constants of the substituents. Because of steric hindrance, tri-o- is 670 times less reactive than tri-p-tolyl-p-methoxyphenylsilane. The relative rates of cleavage of trialkyl-compounds, p-MeO.C6H4.SiR3, are (R=) Me, 1; Et, 0.48; n-Pr, 0.42; i-Pr, 0.06, and this order is attributed to steric effects. Chloro- and (ethylamino)-methyl-p-methoxyphenyl-dimethyl-silane (the latter being present almost wholly as its conjugate acid in the reaction medium) are cleaved 8 and 50 times, respectively, less readily the trimethyl-compound, because of the increased electron-withdrawal from silicon. Steric and polar factors combine to make tribenzyl-p-methoxyphenylsilane 11 times less reactive than the trimethyl-compound. With the compounds MexPh3-xSi.C6H4.OMe-p, the ease of cleavage falls as x increases, the triphenyl- being 61 times less reactive than the trimethyl-compound. (Author)

AD-639 943 **Field 7C**
CFSTI Prices: HC$3.60 MF$0.50
Copenhagen Univ. (Denmark).

THE DETERMINATION OF THE STRUCTURE OF ALPHAAND BETA-FLUORONAPHTALENES AND OTHER SELECTED MOLECULES BY INFRARED AND MICROWAVE TECHNIQUES.
Final rept., 1 Sep 58-30 Apr 61,
by Borge Bak. 25 May 61, 38p
Contract AF 61 (052)-73
Rept. on Microspectropical Investigations.

Descriptors: (*Fluorine compounds, Naphthalenes), (*Naphthalenes, Molecular structure), (*Infrared spectroscopy, Molecular structure), (*Microwave spectroscopy, Molecular structure), Halogenated hydrocarbons, Thiophenes, Benzonitriles, Furans, Labeled substances, Denmark.

Identifiers: Ethyl fluorides, Fluoro naphthalenes.

Topics include: attempted analysis of alph- and beta-fluoronaphtalene microwave spectra; complete structures of thiophene and ethyl fluoride; microwave analysis of 5 isotopic benzonitriles; preparations of 15-N and 13-C enriched benzonitrile and 13-C furans; microwave analysis of alpha 13-C enriched furan; molecular structure correlations.

AD-639 997 **Field 7C**
CFSTI Prices: HC$1.00 MF$0.50
Imperial Coll. of Science and Technology, London (England).
IDENTIFICATION OF PEROXIDES IN COMBUSTION.
Final rept., 1 Mar 56-30 Nov 59,
by F. J. Weinberg. 30 Nov 59, 15p
Contract AF 61 (514)-929
Availability: Microfiche only after original copies exhausted.

Descriptors: (*Hydrocarbons, Oxidation), (*Peroxides, Organic compounds), Combustion, Hydroperoxides, Hydrogen peroxide, Aldehydes, Alkanes, Alkenes, Gas chromatography, Great Britain.

Identifiers: Heptanes, Octanes, Pentenes.

Research was conducted to determine whether the peroxidic compounds observed in oxidation of hydrocarbons are organic hydroperoxides or addition compounds of H_2O_2 with aldehydes. The slow combustion of n-heptane and iso-octane was studied in a flow system under different conditions of temperature and with varying contact times. With n-heptane, formation of an initial hydroperoxide is believed to occur at low temperatures: $C_7H_{16} + O_2$ yields $C_7H_{15}' + HO_2'$ yields $C_7H_{15}OOH$. At higher temperatures probability of separation of the radicals before rearrangement is greater, and the radicals may be expected to undergo individual reactions. Iso-octane is less readily attacked by O_2 than n-heptane, although the CH_2 and CH groups are reached, even though with difficulty, by O_2. Separation of a number of peroxides by gas chromatography was achieved. Slow combustion of isopentene with mixtures of composition $C_5H_{12} + 3O_2$ produced amounts of peroxide varying periodically with increasing temperature, maximum yields being obtained at 360 and 440 C.

AD-640 179 **Field 7C, 6A, 7D**
Not available from CFSTI.
Georgia Inst. of Tech., Atlanta. School of Chemistry.
MECHANISMS OF NUCLEOPHILIC SUBSTITUTION IN PHOSPHATE ESTERS,
by James R. Cox Jr, and O. Bertrand Ramsay. 2 Dec 63, 39p
Grant AF-AFOSR-62-163
Proj. AF-9762
Task 976202
AFOSR-66-1617
Availability: Published in Chemical Reviews v64 n4 p317-52 Jul 24 1964.

Descriptors: (*Organic phosphorus compounds, *Substitution reactions), (*Phosphates, Substitution reactions), Esters, Hydrolysis, P-heterocyclic compounds, Phosphoric acids, Oxidation, Catalysis, Enzymes, Reviews.

The report reviews the literature through December, 1963, concerning mechanisms of nucleophilic substitution in phosphorus- (V) esters. Emphasis is placed on catalytic processes which may serve as models for catalysis by biological systems such as enzymes. (Author)

AD-640 250 **Field 7C, 11I**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
SYNTHESIS AND PROPERTIES OF 1-SILYL-4-(VINYLSILYL) BENZENES,
by E. N. Znamenskaya, and N. S. Nametkin. 6 Apr 66, 16p FTD-TT-65-1665
TT-66-62415
Unedited rough draft trans. of Neftekhimiya (USSR) v4 n3 p487-93 1964.

Descriptors: (*Silanes, Synthesis (Chemistry)), (*Silicone plastics, Preparation), Benzenes, Polymerization, Catalysts, Spectra (Infrared), USSR.

Identifiers: Vinyl silyl benzenes.

There were obtained two vinylhydride-n-phenylene-disilanes not described in the literature: 1-diethylsilyl-4-diethylvinylsilvland 1-methylphenylsilyl-4-methylphenylvinylsilyl-benzene (I). By use of the example of I the possibility of polymerization of vinylhydride-n-phenylenedisilanes is demonstrated. The polymerization of I, in the presence of Pt/C and by the thermal method without a catalyst, takes place with the formation of linear soluble polymers with silicon-phenylene-silicon-carbon chains, which was established by the method of investigation of the infrared absorption spectra. (Author)

AD-640 332 **Field 7C**
CFSTI Prices: HC$4.60 MF$0.50
Consejo Superior de Investigaciones Cientificas, Barcelona (Spain). Departamento de Quimica Organica.
PREPARATION OF HIGHLY STRAINED AROMATIC CHLOROCARBONS. I. A POWERFUL NUCLEAR CHLORINATING AGENT. RELEVANT REACTIVITY PHENOMENA TRACEABLE TO MOLECULAR STRAIN.
Technical scientific note,
by Manuel Ballester, Carlos Molinet, and Juan Castaner. 31 Aug 59, 41p TN-1
Contract AF 61 (052)-141

Descriptors: (*Aromatic compounds, *Chlorination), (*Halogenated hydrocarbons, Synthesis (Chemistry)), Toluenes, Xylenes, Benzenes, Benzoic acids, Photochemistry, Molecular structure, Stability, Stereochemistry, Spain.

Identifiers: Perchloro toluenes, Perchloro xylenes, Tetrachloro benzoic acids, Tetrachloro trichloromethyl benzenes, Dichloro bis (Trichloromethyl) BENZENES.

The preparation of perchlorotoluene and perchloro-p-xylene was effected starting from 2,3,4,5-tetrachloro-1-trichloromethylbenzene and 1,4-bistrichloromethylbenzene, respectively, by means of a powerful nuclear chlorinating agent. 1,3,5-Tristrichloromethylbenzene was inert under the same conditions. Chlorination of 2,4,6-trichloromesitylene with chlorine and white light gave 2,4,6-trichloro-1,3,5-trisdichloromethylbenzene and products of chlorinolysis, no perchloromesitylene being isolated. Perchlorotoluene and perchloro-p-xylene readily underwent chlorinolysis under photochlorination conditions. 2,3,5,6-Tetrachloro-1-trichloromethylbenzene, 2,5-dichloro-1,4-bistrichloromethylbenzene and 2,3,5,6-tetrachlorobenzoic acid, are also reported for fir time. Some significant results related with th preparation and stability of these chlorocarbon are explained on the basis of steric strain an distortion. (Author)

AD-640 333 **Field 7**
CFSTI Prices: HC$2.60 MF$0.50
Consejo Superior de Investigaciones Cientifica Barcelona (Spain). Departamento de Quimic Organica.
MOLECULAR DISTORTION AND ELECTRON IC SPECTRUM OF AROMATIC COMPOUNDS I. CHLORINATED DERIVATIVES OF ALKYL BENZENES.
Technical scientific note,
by Manuel Ballester, and Juan Castener. 31 Aug 59, 22p TN-2
Contract AF 61 (052)-141

Descriptors: (*Chlorine compounds, Aroma ic compounds), (*Aromatic compounds, Ab sorption spectrum), (*Halogenated hydrocar bons, *Absorption spectrum), Benzenes, To luenes, Xylenes, Stereochemistry, Band spec trum, Molecular structure, Spain.

The absortion electronic spectrum of pentachlorobenzene, perchlorobenzene, 2,3,4,5,6-pentachlorotoluene, 2,3,4,5,6-pentachloro-1-chloromethylbenzene, 2,3,4,5,6-pentachloro-1-dichloromethylbenzene, 2,3,4,5-tetrachloro-1-trichloromethylbenzene, 2,3,5,6-tetrachloro-1-trichloromethylbenzene, perchlorotoluene, perchloroethylbenzene, 1,4-bistrichloromethylbenzene, 2,5-dichloro-1,4-bistrichloromethylbenzene, perchloro-p-xylene, and pentamethyltrichloromethylbenzene from 200 millimicrons to the visible region, are reported and discussed. Those compounds having trichloromethyl groups flanked by two ortho chlorine atoms show abnormal spectra, consisting chiefly in great bathochromic shifts of some of their bands from their 'expected' places, which is accounted for in terms of steric strain and molecular distortion. (Author)

AD-640 334 **Field 7**
CFSTI Prices: HC$1.60 MF$0.50
Consejo Superior de Investigaciones Cientificas Barcelona (Spain). Departamento de Quimica Organica.
PREPARATION AND PROPERTIES OF PER-CHLORO-p-XYLYLENE.
Technical scientific note,
by Manuel Ballester, and Juan Castaner. 31 Aug 59, 12p TN-3
Contract AF 61 (052)-141

Descriptors: (*Aromatic compounds, *Chlorine compounds), (*Halogenated hydrocarbons, Chemical properties), Synthesis (Chemistry), Molecular structure, Chlorination, Polymerization, Hydrolysis, Photochemistry, Spectra (Visible + ultraviolet), Spain.

Identifiers: Perchloro xylylenes.

The 'positive halogen' reaction between perchloro-p-xylene and potassium iodide gives an almost quantitative yield of perchloro-p-xylylene. Chemical and spectral evidence agiainst the diradical (benzenoid) structure for this chlorocarbon is presented. (Author)

AD-640 335 **Field 7**
CFSTI Prices: HC$1.10 MF$0.50
Consejo Superior de Investigaciones Cientificas Barcelona (Spain). Departamento de Quimica Organica.
SEMI-MICRO ANALYSIS OF CHLORINE IN HIGHLY CHLORINATED ORGANIC COMPOUNDS.
Technical scientific note,
by Manuel Ballester, and Juan Riera. 30 Sep 60. 10p TN-4
Contract AF 61 (052)-141

Descriptors: (*Chlorine compounds, Quantitative analysis), (*Halogenated hydrocarbons, Quantitative analysis), Magnesium, Powder metals, Chemical analysis, Spain.

A semi-micro analytical method for quantitative determination of chlorine in highly chlorinated compounds - where frequently the currently used methods fail - is described. It is essentially analogous to the macro-methods described by Fedoseev and Ivashova (J. Anal. Chem. URSS v11 p233 1956), and it consists in the reaction of the chlorinated compound with powdered magnesium at 600C. (Author)

AD-640 336 **Field 7C**
CFSTI Prices: HC$1.60 MF$0.50
Consejo Superior de Investigaciones Cientificas, Barcelona (Spain). Departamento de Quimica Organica.
STERIC INHIBITION OF RESONANCE BY ORTHO CHLORINE ATOMS IN STYRENES AND BENZENE CARBOXYLIC ACIDS, SPECTRAL EVIDENCE.
Technical scientific note,
by Manuel Ballester, Juan Castaner, Jose M. Codina, and Francisco Lluch. 30 Nov 60, 15p TN-5
Contract AF 61 (052)-141

Descriptors: (*Chlorine compounds, Aromatic compounds), (*Aromatic compounds, Stereochemistry), (*Halogenated hydrocarbons, Stereochemistry), Styrenes, Benzenes, Carboxylic acids, Benzoic acids, Spectra (Visible +ultraviolet), Molecular orbitals, Resonance, Spain.

Identifiers: Dichloro terephthalic acids, Heptachloro styrenes, Octachloro styrenes, Pentachloro benzoic acids, Tetrachloro benzoic acids, Tetrachloro terephthalic acids.

The ultra-violet spectra of alpha,beta,beta,2,3,4,5-heptachlorostyrene (I), perchlorostyrene (II), 2,3,4,5-tetrachlorobenzoic acid, 2,3,5,6-tetrachlorobenzoic acid, pentachlorobenzoic acid, 2,5-dichloroterephthalic acid, and tetrachloroterephthalic acid, are reported and interpreted. Strong steric inhibition of resonance makes the spectra of the derivatives the side chain of which is flanked by two ortho chlorine atoms to appear almost, or even quite, indistinguishable from those of chlorinated alkylbenzenes of comparable degree of substitution. Also, it is shown that the inhibition of resonance is somewhat relieved in the monoortho chlorinated derivatives. The spectra of (I) and (II) are compared respectively with those of the trans forms of alpha, 2,3,4,5, alpha', 2',3',4',5-decachlorostilbene and perchlorostilbene. (Author)

AD-640 337 **Field 7C**
CFSTI Prices: HC$1.60 MF$0.50
Consejo Superior de Investigaciones Cientificas, Barcelona (Spain). Departamento de Quimica Organica.
SOME NEW CHLORINATED SUBSTANCES STARTING FROM PROPIOPHENONE.
Technical scientific note,
by Manuel Ballester, and Juan Riera. 31 Oct 61, 19p TN-6
Contract AF 61 (052)-141

Descriptors: (*Chlorine compounds, Synthesis (Chemistry)), (*Ketones, *Chlorination), (*Halogenated hydrocarbons, Chemical properties), (*Aromatic compounds, Chlorination), Benzenes, Polycyclic compounds, Spectra (Visible +ultraviolet), Spectra (Infrared), Substitution reactions, Photochemistry, Spain.

Identifiers: Dichloro propenylbenzenes, Eneanochloroindans, Eneanochloro propylbenzenes, Dichloro propiophenones, Propiophenones, Tetrachloro propylbenzenes.

Some chlorinated derivatives starting from propiophenone were prepared and are described for first time: alpha,alpha-dichloropropiophenone (II), alpha,alpha,beta,beta-tetrachloropropylbenzene (III), alpha,beta-dichloropropenylbenzene (IV), 1H-eneanochloroindan (V), and gamma-H, gamma-H,2H-eneanochloropropylbenzene (VII). The characterization of V and VII were accomplished mainly on the basis of their ultraviolet and infra-red spectra. The ultra-violet spectrum of perchloroindan is also reported for first time. It is shown that chlorination of III under the nuclear chlorinating conditions described by Ballester et al. (JACS v82 p4254 1960) can result in side-chain ring closure with the benzene ring. Photochlorination of VII gives also such type of annelation. Also, it is shown that under those chlorinating conditions chlorine addition to ethylene bond, as well as side-chain substitution of hydrogen by chlorine, takes place. (Author)

AD-640 506 **Field 7C**
Not available from CFSTI.
Birkbeck Coll., London (England). Dept. of Chemistry.
1,3,5-TRIAZINES. PART II. THE REACTION OF ACID CHLORIDES WITH TRIPHENYL PHOSPHITE.
Technical note,
by W. Hewertson, R. A. Shaw, and B. C. Smith.
26 Feb 62, 6p TN-2
Contract AF 61 (052)-175
See also AD-640 507.
Availability: Published in Journal of the Chemical Society p3267-8 Aug 1962.

Descriptors: (*Triazines, Synthesis (Chemistry)), (*Organic phosphorus compounds, Chemical reactions), Chlorine compounds, Aromatic compounds, Phosphites, Esters, Great Britain.

Identifiers: Phenyl esters, Phenyl phosphites, Phenyl phosphorochloridites.

Acid chlorides react with triphenyl phosphite to give diphenyl phosphorochloridite and the corresponding phenyl ester. (Author)

AD-640 507 **Field 7C**
Not available from CFSTI.
Birkbeck Coll., London (England). Dept. of Chemistry.
1,3,5-TRIAZINES. PART I. THE REACTION OF CYANURIC CHLORIDE WITH NN-DIETHYLANILINE.
Technical note,
by R. C. Golesworthy, R. A. Shaw, and B. C. Smith. 22 Sep 61, 5p TN-1
Contract AF 61 (052)-175
Availability: Published in Journal of the Chemical Society p1507-8 Apr 1962.

Descriptors: (*Triazines, Synthesis (Chemistry)), Organic nitrogen compounds, Chlorine compounds, Chemical reactions, Great Britain.

Identifiers: Cyanuric chloride, Dichloro diethylanilino triazines, Dichloro ethylanilino triazines, Diethyl anilinines.

Cyanuric chloride reacts with NN-diethylaniline to give 2,4-dichloro-6-N-ethylanilino-1,3,5-triazine and 2,4-dichloro-6-p-NN-diethylanilino-1,3,5-triazine. (Author)

AD-640 508 **Field 7C**
Not available from CFSTI.
Birkbeck Coll., London (England). Dept. of Chemistry.
1,3,5-TRIAZINES. PART IV. PHOSPHINO-1,3,5-TRIAZINES.
Technical note,
by W. Hewertson, R. A. Shaw, and B. C. Smith.
Mar 64, 9p TN-4
Contract AF 61 (052)-175
See also AD-640 511.
Availability: Published in Journal of the Chemical Society p1020-6 Mar 1964.

Descriptors: (*Triazines, Chemical reactions), (*Organic phosphorus compounds, Triazines), Synthesis (Chemistry), Complex compounds, Decomposition, Bromination, Hydrolysis, Oxidation, Phosphines, Great Britain.

Identifiers: Phosphino triazines.

Phosphino-1,3,5-triazines were prepared by three different methods, and their reactions were studied. Addition of methyl iodide, oxygen, sulphur, or selenium occurs under suitable conditions, and some metal complexes of trisdiphenylphosphino-1,3,5-triazine (I) were prepared. Cleavage of the phosphorus-triazine bond occurs on bromination, oxidative hydrolysis, or treatment with an excess of methyl iodide. Phosphinotriazines are compared with phosphines containing P-acyl, P-P, and P-Ge bonds. (Author)

AD-640 509 **Field 7C**
Not available from CFSTI.
Birkbeck Coll., London (England). Dept. of Chemistry.
1,3,5-TRIAZINES. PART VI. THE REACTION OF HEXAMETHYLDISILAZYL-LITHIUM WITH CYANURIC CHLORIDE.
Technical note,
by E. H. Amonoo-Neizer, R. C. Golesworthy, R. A. Shaw, and B. C. Smith. 23 Feb 65, 5p TN-6
Contract AF 61 (052)-175
See also AD-640 508.
Availability: Published in Journal of the Chemical Society p5452-3 Oct 1965.

Descriptors: (*Triazines, Chemical reactions), (*Silanes, Chemical reactions), Chlorine compounds, Lithium compounds, Imides, Amines, Synthesis (Chemistry), Great Britain.

Identifiers: Cyanuric chloride, Bis (Trimethylsilyl) carbodiimides, Tris (Hexamethyl disilazyl) triazines, Tris (Trimethylsilyl) amines, Hexamethyl disilazyl lithium.

Hexamethyldisilazyl-lithium reacts with cyanuric chloride to give bis (trimethylsilyl) carbodiimide, 2,4,6-tris (hexamethyldisilazyl)-1,3,5-triazine, and tris (trimethylsilyl)amine. Interconversions of some of these products are reported, and possible reaction schemes are discussed. (Author)

AD-640 510 **Field 7C**
Not available from CFSTI.
Birkbeck Coll., London (England). Dept. of Chemistry.
COMPOUNDS OF SILICON. PART IV. REACTIONS OF HEXAMETHYLDISILAZYL-LITHIUM WITH CHLOROSILANES.
Technical note,
by E. H. Amonoo-Neizer, R. A. Shaw, D. O. Skovlin, and B. C. Smith. 31 Aug 64, 7p TN-5
Contract AF 61 (052)-175
Availability: Published in Journal of the Chemical Society p2997-9 Apr 1965.

Descriptors: (*Silicon compounds, Chemical reactions), (*Silanes, Chemical reactions), (*Organic nitrogen compounds, Silanes), Chlorine compounds, Decomposition, Lithium compounds, Chlorides, Organic solvents, Great Britain.

Identifiers: Chlorosilanes, Hexamethyl disilazyl lithium, Silazanes.

Hexamethyl-lithium reacts with chlorosilanes. One or more chlorine atoms are replaced by hexamethyldisilazyl groups, and lithium chloride is formed. Reaction takes place more readily in tetrahydrofuran than in benzene or in the absence of solvent. (Author)

AD-640 511 **Field 7C**
Not available from CFSTI.
Birkbeck Coll., London (England). Dept. of Chemistry.

1,3,5-TRIAZINES. PART III. ARBUZOV REACTIONS OF CHLOROTRIAZINES.
Technical note,
by W. Hewertson, R. A. Shaw, and B. C. Smith.
10 Oct 62, 9p TN-3
Contract AF 61 (052)-175
See also AD-640 506.
Availability: Published in Journal of the Chemical Society p1670-5 Mar 1963.

Descriptors: (*Triazines, Chemical reactions), (*Organic phosphorus compounds, Chemical reactions), Chlorine compounds, Esters, Chemical bonds, Thermal stability, Hydrolysis, Halogenated hydrocarbons, Great Britain.

Identifiers: Arbuzov reactions, Chloro triazines.

Arbuzov reactions of chloro-1,3,5-triazines with phosphorus (III) alkyl esters give triazino-derivatives of phosphorus. The relative ease of replacement of chlorine in 4,6-disubstituted 2-chloro-1,3,5-triazines is discussed in terms of the electron-withdrawing effect of the 4,6-substituents, and of groups X in the esters X2P.OR. The products are less stable to heat and hydrolysis than are corresponding benzene derivatives. (Author)

AD-640 513 **Field 7C**
CFSTI Prices: HC$1.60 MF$0.50
Consejo Superior de Investigaciones Cientificas, Barcelona (Spain). Departamento de Quimica Organica.
ULTRAVIOLET SPECTRUM OF SOME POLYCHLORINATED ALKYLBENZENES.
Technical scientific note,
by M. Ballester, J. Castaner, and E. Guardiola.
28 Jun 63, 18p TN-7
Contract AF 61 (052)-141

Descriptors: (*Chlorine compounds, *Aromatic compounds), (*Halogenated hydrocarbons, *Spectra (Visible +ultraviolet)), Benzenes, Xylenes, Band spectrum, Electron transitions, Spain.

Identifiers: Hexachloro xylenes, Nonachloro ethylbenzenes, Nonachloro mesitylenes, Octachloro xylenes, Tetrachloro xylenes, Trichloro mesitylenes.

The ultra-violet absorption spectra of ortho-H-nonachloroethylbenzene, 2,3,5,6-tetrachloro-p-xylene, alpha-H, alpha-H, alpha'-H, alpha'-H-hexachloro-p-xylene, alpha-H, alpha'-H-octachloro-p-xylene, alpha-H, alpha'-H-octachloro-m-xylene, 2,4,6-trichloromesitylene, 2H, 4H, 6H-nonachloromesitylene, alpha-H, alpha'-H, alpha (double prime)-H-nonachloromesitylene are reported. The data cover the range between 200 millimicrons and the visible region. The various effects of the substituents on the location and the value of the maximum absorptions are discussed and interpreted. (Author)

AD-640 515 **Field 7C**
CFSTI Prices: HC$1.60 MF$0.50
Consejo Superior de Investigaciones Cientificas, Barcelona (Spain). Departamento de Quimica Organica.
THE MIGRATION (SPECTROSCOPIC) MOMENT AND THE 'SATURATION EFFECT'. ULTRAVIOLET BAND RE-ASSIGNMENT FOR ANILINE AND ITS DERIVATIVES.
Technical scientific note,
by Manuel Ballester, and Juan Riera. 5 Jul 63, 20p TN-9
Contract AF 61 (052)-141

Descriptors: (*Organic nitrogen compounds, Spectra (Visible + ultraviolet)), (*Ultraviolet spectroscopy, Organic nitrogen compounds), Absorption spectrum, Electron transitions, Molecular energy levels, Molecular orbitals, Spain.

Identifiers: Anilines.

It is shown that the current band assignment of the ultraviolet absorption spectrum for anilines and derivatives (Klevens and Platt) is erroneous. The evidence afforded, which include different aspects of the analysis of the absorptivities or oscillator strengths (migration moment, saturation effect and halfwidth), show that the 300 millimicron band is related to the 'singlet-A1g to singlet-B2u' ('singlet-A to singlet-Lb' secondary band) transition. The data for the substituted anilines allow to expand the study of the saturation effect of the secondary band initial in a preceding report. The evidence afforded seems to indicate that such effect depends mainly upon the resultant migration moment, and also upon the pi-electron density about the benzene nucleus and the polarizabilities of the substituents. It is shown that the evidence afforded by Goodman and Frolen concerning the participation of d-orbitals of bromine in p-bromoanisole is inconclusive. (Author)

N66-27035 **Field 7C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
CYANIC ACID SYNTHESIS IN A FLUIDIZED BED REACTOR.
by M. Nakagawa. Jul 63, 13p NASA-TT-F-8496
Transl. Into English From Kagaku Kogyu (Japan) No. 9, Sep. 1956 P 29-33

Descriptors: *Ammonia, *Chemical reaction, *Cyano compound, *Fluidized-bed reactor, *Methane, Aluminate, Bed, Carbon, Catalyst, Chemical, Compound, Cyanogen, Fluid, Nitrogen, Organic, Reaction, Reactor, Synthesis.

For abstract, see S 04 15.

N66-27225 **Field 7C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
STUDY OF CYANIC ACID SYNTHESIS BY FIXED CATALYST METHOD.
by H. Harada, M. Nakagawa, M. Ninomiya, T. Ohara, and M. Otake. Jul 63, 11p NASA-TT-F-8494
Transl. Into English From Kogyo Kagaku Zasshi (Tokyo), V. 59, No. 1, 1956, P 121-124

Descriptors: *Ammonia, *Catalyst, *Cyanogen, *Methane, Adsorption, Aluminum, Bed, Carbon, Durability, Fixed, Heating, Oxide, Reaction, Silica, Synthesis, Thorium, Yield.

For abstract, see S 04 15.

N66-28370 **Field 7C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
STUDY OF THE FORMATION REACTION OF POLYBENZIMIDAZOLES.
Issledovaniye Reaktsii Obrazovaniya Polibenzimidazolov
by T. M. Frunze, A. A. Izyneyev, V. V. Korshak, and V. V. Kurashev. May 66, 12p NASA-TT-F-10174
Transl. Into English From Dokl. Akad. Nauf Sssr (Moscow), V. 149, No. 1, 1963 P 104-106

Descriptors: *Chemical reaction, *Polybenzimidazole, *Polymer chemistry, Analysis, Chemical, Chemistry, Compound, Formation, High, Molecular, Polymer, Reaction, Synthesis.

For abstract, see S 04 15.

N66-28379 **Field 7C**
CFSTI Prices HC$4.00 MF$1.00
Melpar, Inc., Falls Church, Va.
DETECTION OF CARBON DIOXIDE WITH CHEMICAL TAPES FINAL REPORT.
Dec 65, 140p NASA-CR-65378
Contract NAS9-2883

Descriptors: *Carbon dioxide, *Chemical reaction, *Detection, Carbon, Change, Chemical, Color, Contamination, Dioxide, Reaction, Spacecraft, Tape.

For abstract, see S 04 15.

N66-29076 **Field 7C**
CFSTI Prices HC$2.00 MF$0.50
General Precision, Inc., Little Falls, N. J. Research Center.
HIGH TEMPERATURE STABLE CARBORANE ADHESIVES FIRST QUARTERLY PROGRESS REPORT, 21 DEC. 1965 - 20 MAR. 1966.
by R. Barnes. 15 Apr 66, 31p NASA-CR-65399
Contract NAS9-5527

Descriptors: *Adhesive, *Boron compound, *Chemical reaction, *High temperature environment, *Hydrocarbon, *Space environment, Aerospace, Boron, Carborane, Chemical, Compound, Environment, Epoxy, High temperature, Reaction, Space, Synthesis.

For abstract, see S 04 16.

N66-29295 **Field 7C**
CFSTI Prices HC$2.00 MF$0.50
Purdue Univ., Lafayette, Ind. Dept. Of Chemistry.
SUBSTITUENT EFFECTS IN UNIMOLECULAR ION DECOMPOSITIONS. III - ELUCIDATION OF COMPETING ALTERNATIVE PATHWAYS FOR THE FORMATION OF A PARTICULAR ION.
by M. M. Bursey, and F. W. Mc lafferty. 1966, 26p NASA-CR-75820
Contract NGR-15-005-021
Presented In Part At The 150th Natl. Meeting, Am. Chem. Soc., Atlantic City, Sep. 1965 Submitted For Publication

Descriptors: *Ionization, *Mass spectrum, *Molecular ion, Acetyl, Alternative, Chemical, Effect, Formation, Hydrocarbon, Ion, Kinetics, Mass, Molecular, Path, Phenyl, Process, Propyl, Spectrum, Substitution.

For abstract, see S 04 16.

N66-29524 **Field 7C**
CFSTI Prices HC$4.00 MF$1.00
Georgia Inst. Of Tech., Atlanta. School Of Chemical Engineering.
MASS SPECTROMETRIC STUDY OF THE PRODUCTS OBTAINED FROM FAST CRYOGENIC QUENCHING OF SEVERAL REACTIONS INVOLVING ATOMIC HYDROGEN OR ATOMIC OXYGEN.
by D. B. Bivens. May 66, 129p NASA-CR-75871
Grant NSG-337

Descriptors: *Cryogenic temperature, *Hydrogen atom, *Mass spectrometer, *Oxygen atom, *Quenching, Acetylene, Acid, Ammonia, Atom, Chemical, Cryogenic, Ethane, Ethylene, Hydrogen, Mass, Nitric, Oxygen, Product, Reaction, Spectrometer, Temperature.

For abstract, see S 04 16.

N66-29726 **Field 7C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
DIFERROCENYLS AND TERFERROCENYLS.
Diferrotsenily l Terferrotsenily
by V. N. Drozd, A. N. Nesmeyanov, L. A. Nikonova, A. K. Prokofyev, and V. I. Romanenko.
May 66, 20p NASA-TT-F-10175
Transl. Into English From Izv. Akad. Nauk Sssr, Otd. Khim. Nauk (Moscow), No. 4, 1963 P 667-674

Descriptors: *Chemical reaction, *Ferrocene, *Organometallic compound, *Synthesis, Absorption, Chemical, Compound, Frequency, Halogen, Infrared, Iron, Iron compound, Nucleus, Organometallic, Reaction, Spectrum.

For abstract, see S 04 16.

N66-35664 **Field 7C**
CFSTI Prices HC$2.00 MF$0.50
American Univ., Washington, D. C.
INVESTIGATION OF ELECTROCHEMISTRY OF HIGH ENERGY COMPOUNDS IN ORGANIC ELECTROLYTES THIRD PROGRESS REPORT, NOV. 1, 1965 - APR. 30, 1966.
by R. T. Foley, L. E. Helgen, and L. Schubert.
1966, 40p NASA-CR-62034
Contract NGR-09-003-005

Descriptors: *Chemical reaction, *Electric property, *Electrochemistry, *Ester, *Metal, Acid, Calcium, Carbonate, Chemical, Condensation, Cyclic, Electrolysis, High energy, Lithium, Magnesium, Organic, Potassium, Property, Propylene, Reaction, Salt, Silver, Sodium, Stability.

For abstract, see S 04 21.

N66-35956 **Field 7C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
TITRIMETRIC SEMIMICRO DETERMINATION OF FUNCTIONAL GROUPS IN HUMIC PREPARATIONS.
Titrometricheskiy Polumikrometod Opredeleniya Funktsional'nykh Grupp V Guminovykh Preparatov
by T. A. Kukharenko. Aug 66, 14p NASA-TT-F-10251
Transl. Into English From Zh. Analit. Khim. (Moscow), V. 3, No. 3, 1948 P 181-185

Descriptors: *Carboxyl group, *Chemical analysis, *Hydroxyl, Analysis, Carboxylic, Chemical, Function, Group, Phenol, Reaction, Test, Titrimeter.

For abstract, see S 04 21.

AD-639 845 **See Field 6P**

AD-639 899 **See Field 7D**

AD-639 939 **See Field 7E**

AD-640 178 **See Field 20B**

PB-170 960 **See Field 14B**

PB-173 237 **See Field 7E**

UCRL-16880 **See Field 6A**

7D. PHYSICAL CHEMISTRY

AD-453 346 **Field 7D, 11C**
CFSTI Prices: HC$2.60
CBS Labs., Stamford, Conn.
ALL-EVAPORATED AND MASKLESS FABRICATION TECHNIQUES FOR ACTIVE DEVICES.
Interim development rept. no. 2, 29 Aug-28 Nov 64.
9 Dec 64, 30p
Contract NObsr-87512
See also AD-447 445, and AD-470 481.

Descriptors: (*Semiconducting films, Silicon), (*Vapor plating, *Silicon), Films, Reviews, Epitaxial growth, Single crystals, Impurities, Ions, Ion beams, Microstructure, Chemical etching, High-temperature research, Impurities, Impregnation, Doping.

Identifiers: Substrates.

The silicon evaporation fixtures were completed and a single run of silicon evaporations was made. The deposited silicon films were evaluated by optical microscopy and by chemical etching. The films are onocrystalline, but contain defects. The origin of the defects is discussed. A calculation of the evaporation parameters is given. The ion generator is 90% complete. (Author)

AD-461 647 **Field 7D**
CFSTI Price: HC$1.60
Naval Radiological Defense Lab., San Francisco, Calif.
ENERGY LEVELS IN 57FE.
Final rept.,
by James M. Mathiesen, and John P. Hurley. Feb 65, 17p USNRDL-TR-822
Proj. SF-011-01-03
Task 11275

Descriptors: (*Atomic energy levels, Iron), Gamma counters, Intensity, Resolution, Electron capture, Cobalt, Gamma-ray spectra, Attenuation, Excitation, Isotopes, Measurement.

The energies and intensities of the gamma rays from 57Fe have been measured using a high resolution Ge (Li) detector. Nine gamma rays were detected at energies of 14, 123, 137, 340, 353, 367, 570, 693, and 707 keV. Relative intensities of these transitions were also determined from these measurements. An energy level scheme is proposed and discussed. (Author)

AD-639 652 **Field 7D, 20H**
CFSTI Prices: HC$1.00 MF$0.50
General Electric Co., Schenectady, N. Y. Research and Development Center.
ELECTRON-MOLECULE COLLISION CROSS SECTIONS IN HELIUM AND ARGON MEASURED BY A TIME-OF-FLIGHT TECHNIQUE,
by G. C. Baldwin. Aug 66, 6p Rept. no. 66-C-246
Contract Nonr-3942 (00)

Descriptors: (*Helium, Electron bombardment), (*Neon, Electron bombardment), (*Electron bombardment, Helium group gases), Probability, Transport properties, Spectroscopy.

Identifiers: Particle interactions.

The total collision cross sections of helium and argon for electrons of very low energy have been measured by a new technique employing time-of-flight velocity selection. The present measurements extend below 200 mev; the ultimate limit of the technique is about one decade lower. Helium shows a 6 sq A cross section, decreasing monotonically below 400 mev with no structure. The argon cross section falls from 1.6 sq. A at 1 volt to a minimum of 0.4 sq. A at 300 mev, and then rises steeply. (Author)

AD-639 659 **Field 7D, 6K, 7A**
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
THE ADSORPTION OF CARBON DIOXIDE ON CARBON SOLIDS. PART I - GRAPHITE AND DIAMOND AT 0C.
Interim rept.,
by V. R. Deitz. 11 Jul 66, 18p NRL-6400
Proj. RR-001-01-43-4702

Descriptors: (*Carbon dioxide, Adsorption), (*Graphite, Sorption), (*Diamonds, Sorption), Surface properties, Thermodynamics, Chemisorption, Carbon black, Charcoal, Pyrolytic graphite, Porosity.

Identifiers: Adsorbents.

The high-temperature physical adsorption of carbon dioxide (<<1% coverage) was measured on a number of relatively well defined carbon solids. The results provide an experimental means to differentiate between two arrays of adsorption sites that originate in the strong anisotropy of the graphite structure. The adsorption isotherms at 0C indicate two distinct regions of surface coverage that are separated by a wide plateau. The adsorption at very low pressures (<0.01 torr) is considered to correspond to high-energy adsorption on an array of edge carbon atoms in the prism faces; the additional adsorption at higher pressures takes place at sites of lesser energy in the more abundant basal planes. Similar behavior was observed for graphitized carbon black FT (2700C), mineral graphite, an annealed pyrolytic graphite, and a deashed heat-treated (1500C) coconut charcoal. In contrast, the adsorption of carbon dioxide on purified natural-diamond fragments followed a simple Langmuir isotherm compatible with the known isotropic structure of diamond. The amounts adsorbed expressed per unit area bring out similarities among the carbon solids that are characteristic of graphite. The large adsorption on the coconut charcoal appears due only to the large area that is essentially basal plane in behavior. There is evidence that the pyrolytic graphite has a porosity that may be invaded more completely by carbon dioxide than by krypton. (Author)

AD-639 680 **Field 7D**
Not available from CFSTI.
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.
SCATTERING OF HIGH VELOCITY NEUTRAL PARTICLES. XIV. He-He INTERACTION BELOW 1. 1A,
by J. E. Jordan, and I. Amdur. 1966, 85p
Supported in part by ONR. See also AD-613 150.
Availability: Published in Journal of Chemical Physics.

Descriptors: (*Molecular beams, Scattering), (*Helium, *Elastic scattering), Probability, Potential scattering, Quantum statistics, Functions, Ion sources.

Identifiers: Particle interactions.

Total elastic cross sections were measured for helium atoms within energies between 300 eV and 2000 eV which were scattered by room temperature helium through an effective laboratory angle greater than about 0.005 radian. A detailed analysis of the scattering results treats: effect on the measured cross sections of the intensity distribution in the beam and of the beam-detector geometry; interpretation of the results in terms of different empirical monotonic potential functions--the exponential, the screened coulomb, and the point repelling inverse power; and the effects of quantum scattering. Numerical values for the He-He potential between 0.61A and 1.12A for the three assumed potential functions show good internal consistency and agree with the best theoretical values within the combined estimates of the maximum uncertainties in the experimental and theoretical values. The mean potential obtained from the three empirical functions may be represented within about 1.8 percent by: V (r) sub mean = 196 exp (-4.21r) eV; 0.61A<r<1.12A. (Author)

AD-639 708 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
MEASUREMENT OF THE RECOMBINATION RATE OF NO (+) WITH ELECTRONS AND THE MOBILITY OF NO (+).
Final rept. 1 Oct 64-30 Jun 66,
by Robert A. Young. 1 Jun 66, 16p
Contract AF 19 (628)-4357
Projs. SRI-PAU-5194, 5710
AFCRL-66-474
SRI-5194

Descriptors: (*Nitrogen compounds, Oxides), (*Recombination reactions, Reaction kinetics), Gas discharges, Dissociation, Gas ionization, Ions, Density, Electrons.

Identifiers: Nitrogen oxides.

The dissociative recombination coefficient of NO (+) with e was measured as (4 plus or minus 1) X

0.0000001 cc/sec. The ions were produced uniformly in space and time in a mixture of N, O, and N2 by chemionization processes. Ion densities were measured by a pulsed total ion collection method. Analysis of the growth of ionization with time and analysis of the dependence of the square of ion density on ion production rate gives essentially identical values for the recombination coefficient. (Author)

AD-639 723 **Field 7D**
Not available from CFSTI.
Chicago Univ., Ill. Dept. of Chemistry.
PROPERTIES OF SOLUTIONS OF METALS DISSOLVED IN MOLTEN SALTS.
Final tech rept., 1 Feb 64-31 Jan 66,
by Norman H. Nachtrieb. 22 May 66, 71p
Grant AF-AFOSR-624-64
Proj. AF-9710
Task 971002
AFOSR-66-1947
Availability: Published in Rev. Sci. Instr. v35 p680 1964; The Journal of Chemical Physics v40 n10 p2891-8 May 15 1964; The Journal of Chemical Physics v42 n2 p631-6 Jan 15 1965; Zeitschrift fuer Naturforschung v20a n3 p321-4 1965; Journal of Physical Chemistry.

Descriptors: (*Liquid metals, Physical properties), (*Salts, Physical properties), Nuclear magnetic resonance, Magnetic properties, Electrical conductance, Magneto-optic effect, Refraction, Instrumentation, Thallium compounds, Alkali metal compounds, Crystals, Iodides.

Identifiers: Fused salts.

Research on the properties of molten salts was conducted along five independent but related lines of investigation: (1) nuclear magnetic resonance, (2) magnetic susceptibility, (3) electrical conductance, (4) magnetooptic rotation (Faraday effect), and (5) molar-refractivity. The results provided information on the nature of the interactions between ions in pure fused salts and binary molten mixtures. In particular, the effect of temperature on the NMR was measured and interpreted in terms of an increasing covalent interaction between cations and anions with increasing temperature. Electrical conductance studies of salts dissolved in molten iodine revealed the existence of solvent equilibria of the kind, 212 = I (+) + I3 (-), and ion-pairing reactions of the type, I2 + M (+)I (-) = M (+) + I3 (-). (Author)

AD-639 749 **Field 7D, 12A**
CFSTI Prices: HC$1.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
THE SOLUTION OF THE LIOUVILLE EQUATION IN THE INFINITE LIMIT,
by Boris Leaf, and William C. Schieve. 6 Sep 66, 21p USNRDL-TR-1066
Proj. ZR-011-01-01
Task 0401

Descriptors: (*Statistical mechanics, *Integral equations), Fourier analysis, Series, Operators (Mathematics).

Identifiers: Liouville equation.

Methods have been developed for performing the Cauchy integral identified in a previous paper. The singularities in the complex plane of this integral determine the time dependence of the solutions of the Liouville equation in the infinite limit for systems describable in angle-action variables. The singularities do not have the form assumed previously in analogy with the work of Prigogine's group. Solutions in the infinite limit have the same form as for finite systems. Taking the infinite limit, with continous spectrum of the Liouville operator, is equivalent to expressing the solution to the Liouville equation as a Fourier integral in the angle variables instead of a Fourier series as for a finite system with periodic boundary conditions. The solution in this case is no longer multiply periodic in time. The phase space on which ensemble averages are computed must be extended from the range zero to one for the angle variables for finite systems to the range of the entire real axis for systems in the infinite limit. The Liouville operator is Hermitian on this space. For systems for which angle-action variables exist, the solutions of the Liouville equation cannot become time-independent even in the infinite limit. (Author)

AD-639 899 **Field 7D, 7C**
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
DECOMPOSITION OF TROPYLIUM AND SUBSTITUTED TROPYLIUM IONS,
by K. R. Jennings, and J. H. Futrell. 30 Nov 65, 7p ARL-66-0167
Proj. AF-7023
Availability: Published in Journal of Chemical Physics v44 n11 p4315-9 Jun 1 1966.

Descriptors: (*Monocyclic compounds, Decomposition), Cycloalkenes, Mass spectrum, Alkynes, Toluenes, Heat of formation, Electron transitions, Ions, Molecular energy levels, Halogenated hydrocarbons, Reaction kinetics.

Identifiers: Tropilidienes.

Metastable transitions arising from the decomposition of tropylium ions were investigated in a double-focusing mass spectrometer. It is shown that the loss of an acetylene molecule is the only major decomposition process, and metastable peaks in the mass spectrum of toluene-alpha-d3 were interpreted in terms of this. The relative intensities of the metastable peak and the normal peak at m/e=65 in the mass spectra of several compounds were shown to correlate with the apparent heat of formation of the C7H7 (+) ion. Metastable transitions in the mass spectra of several halogenated and alkylated toluene and benzyl compounds were interpreted in terms of the decomposition of substituted tropylium ions by the elimination of C2H2 or C2HX (X = F, Cl, Br). No evidence could be found for the existence of a pseudotropylium ion in which a CH group is replaced by a N atom in the mass spectra of alkyl pyridines. (Author)

AD-639 900 **Field 7D**
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
THERMAL DIFFUSION IN SOME NON-AQUEOUS ELECTROLYTE SOLUTIONS,
by Julius G. Becsey, James A. Bierlein, and Silas E. Gastaffson. 19 Feb 66, 5p ARL-66-0133
Proj. AF-7023
Availability: Published in Zeitschrift fur Naturforschung v21 n4 p488-90 1966.

Descriptors: (*Electrolytes, Diffusion), (*Potassium compounds, Solutions), (*Formamides, Electrolytes), Thermal properties, Organic solvents, Chlorides, Bromides, Iodides, Concentration (Chemistry).

Identifiers: Dimethyl formamides, Methyl formamides, Potassium bromide, Potassium chloride, Potassium iodide, Soret effect.

Some experimental results are reported for the Soret coefficients of potassium halides in formamide, N-methyl formamide, and N, N-dimethyl formamide.

AD-639 951 **Field 7D, 13H**
CFSTI Prices: HC$2.00 MF$0.50
Army Weapons Command, Rock Island, Ill. Research and Engineering Div.
INTERFERENCE MICROSCOPIC EXAMINATION OF FLUID FILMS ON METAL SURFACES.
Final rept. Jul 64-Dec 65,
by Bernard J. Bornong. Jun 66, 36p
Proj. DA-1C014501B13A
R1A-66-2048

Descriptors: (*Films, Metals), Surface properties, Corrosion inhibition, Liquids, Viscosity, Refractive index, Thickness, Surface tension, Density.

Profiles of fluid films on metal surfaces were measured by means of interference microscopy. The purpose of the work was to further characterize the behavior of fluid films and adsorbed films on metals in terms of molecular structure of the fluid components, surface topography and surface energy. The method used was similar to one described by Bascom, Cottington and Singleterry of the Naval Research Laboratory. Film profiles were measured down to thicknesses of about 1000 angstroms by this method. The results confirmed the mechanism for spreading of liquids which was advanced by Bascom and co-workers. Squalane films containing 0.01% by weight oleic acid did not spread on polished stainless steel or platinum. Films containing 0.1% by weight and 0.3% by weight oleic acid did spread on platinum, but at a slower rate than did the pure squalane. Results are interpreted in terms of known surface energy relationships. Effects of surface contamination by particles and by adsorbed films can be readily observed by the method of interference microscopy. Under some conditions the micro-relief structure of the metal surface can also be observed and estimates made of the heights of the surface elevations. (Author)

AD-639 980 **Field 7D**
Not available from CFSTI.
Stanford Univ., Calif. Dept. of Chemistry.
TREATMENT OF LIQUID-LIQUID PHASE EQUILIBRIA. HYDROCARBON-PERFLUOROCARBON MIXTURES.
Interim rept.,
by A. Abe, and P. J. Flory. 3 Feb 66, 10p
Contract AF 49 (638)-1341
Proj. AF-9760
Task 976003
AFOSR-66-1863
Availability: Published in Journal of the American Chemical Society v88 n13 p2887-93 Jul 5 1966.

Descriptors: (*Hydrocarbons, Mixtures), (*Halogenated hydrocarbons, Mixtures), Phase studies, Fluorine compounds, Methane, Alkanes, Cyclohexanes, Enthalpy, Thermochemistry.

Methods were developed for treating critical miscibility and phase equilibria in binary liquid systems according to the theory of solutions presented previously. These methods were applied to the critical solution behavior of four hydrocarbon-perfluorocarbon systems as follows: methane-carbon tetrafluoride, n-hexane-perfluoro-n-hexane, n-heptane-perfluoro-n-heptane, and methylcyclohexane-perfluoromethylcyclohexane. The interaction parameter X12 characterizing each mixture is evaluated from the observed critical solution temperature (UCST). Critical compositions calculated according to theory agree very well with those observed. In conformity with a previous observation, the theory underestimates the large excess volumes characteristic of hydrocarbon-perfluorocarbon mixtures by a factor of 2. Excess enthalpies and excess free energies are fairly well reproduced by theory. Excellent agreement with observed enthalpies and free energies is achieved by using the observed excess volumes in place of those calculated according to theory. (Author)

AD-639 996 **Field 7D**
CFSTI Prices: HC$4.00 MF$0.75
Goettingen Univ. (West Germany). Institut fuer Physikalische Chemie.
THE PYROLYSIS AND OXIDATION OF HYDRAZINE IN SHOCK WAVES.
Technical summary rept.
28 Feb 62, 118p TR-3
Contract AF 61 (514)-1142
ARL-62-435

Descriptors: (*Hydrazine, *Shock waves), Pyrolysis, Oxidation, Thermochemistry, Chemical bonds, Ammonia, Heat of activation, Nitrogen compounds, Dioxides, Reaction kinetics, Ultraviolet radiation, West Germany.

Dependence of the thermal decomposition of hydrazine upon temperature, concentration, pressure and oxygen proportion between 1100K and 1400K was established by incident and reflected shock techniques (2<M<3.5). UV-extinction coefficients of hydrazine was measured up to 1350K, those of ammonia up to 2600K. A simple innovation in shock tube methods facilitates determination of reaction products and was applied to the pyrolysis of hydrazine. The occurence of HN and preliminary results about the thermal decomposition of ammonia at temperatures of 2100K - 2600K are reported. The reaction of nitrogen dioxide and hydrazine was investigated in a flow system. A review of hydrazine literature is given. (Author)

AD-640 001 **Field 7D**
Not available from CFSTI.
Westinghouse Research Labs., Pittsburgh, Pa.
OXIDATION OF SILICON AT HIGH TEMPERATURES AND LOW PRESSURE UNDER FLOW CONDITIONS AND THE VAPOR PRESSURE OF SILICON.
Revised ed.,
by Earl A. Gulbransen, Kenneth F. Andrew, and Fred A. Brassart. 15 Apr 66, 5p
Contract DA-31-124-ARO (D)-196
AROD-4067:1
Revision of manuscript submitted 2 Jul 65. Prepared for presentation at the Buffalo Meeting, Oct. 10-14, 1965.
Availability: Published in Journal of the Electrochemical Society v113 n8 p834-7 Aug 1966.

Descriptors: (*Silicon, Oxidation), Reaction kinetics, High-temperature research, Low-pressure research, Gas flow, Vapor pressure, Thermochemistry.

Wagner has predicted from thermochemical and diffusion theory analyses that silicon may react actively or passively with oxygen at high temperature depending on the oxygen pressure. To determine the characteristics of the oxidation reaction for these reaction conditions, a kinetic study was made at temperatures between 1100C and 1300C and pressures of 0.009, 0.04, and 0.1 Torr using a dynamic reaction system. Very fast reactions were found where predicted. The results were also related to (i) kinetic theory reaction efficiencies and (ii) gas flow efficiencies. Vapor pressure studies were made using the Langmuir method. (Author)

AD-640 140 **Field 7D, 7B**
CFSTI Prices: HC$2.60 MF$0.50
Oxford Univ. (England). Inorganic Chemistry Lab.
THE REACTION OF ATOMS AND RADICALS WITH VARIOUS MOLECULES.
Annual summary rept., 1 Oct 62-30 Sep 63.
by J. W. Linnett. Dec 63, 26p
Grant AF-EOAR-32-63

Descriptors: (*Chemical reactions, Surfaces), (*Hydrogen, Absorption (Physical)), (*Recombination reactions, Gases), (*Oxides, Chemical reactions), Metals, Gas discharges, Silver, Copper, Gold, Oxidation, Palladium, Palladium alloys, Gold alloys, Chlorine, Reaction kinetics, Powders, Films, Catalysis, Semiconductors, Great Britain.

CONTENTS: Atomic reactions at metal surface; Absorption of hydrogen atoms by palladium and palladium-gold alloys; Recombination of atoms in the gas phase; Atomic reactions at oxide surfaces.

AD-640 141 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Techion - Israel Inst. of Tech., Haifa.
ATLAS AND WAVENUMBER TABLES OF WATER VAPOR ABSORPTION AT 1200K IN THE 1.9 AND 2.7 MICRON REGIONS,
by U. P. Oppenheim, and A. Goldman. 30 Jul 64, 23p Scientific-1
Grant AF-EOAR-111-63

Descriptors: (*Water vapor, *Absorption spectrum), (*Infrared spectroscopy, Water vapor), Line spectrum, Band spectrum, Tables, Israel.

The frequency (in 1/cm) of a large number of rotational lines in the 1.9 and 2.7 micron bands of heated water vapor was determined. The measurements were carried out on pure water vapor by the use of a Perkin-Elmer Model 12G Infrared Spectrometer. The gas was heated to 1200K in quartz cells situated in an electrical furnace. Recorder tracings showing these spectra with a resolution of 0.5/cm and tables of line positions with an absolute accuracy plus or minus 0.2/cm are included. The tables contain many new lines which appear only at elevated temperatures. (Author)

AD-640 169 **Field 7D, 21B**
CFSTI Prices: HC$1.10 MF$0.50
Hull Univ. (England).
KINETICS OF HYDROGEN-OXYGEN AND HYDROCARBON-OXYGEN REACTIONS.
Final rept., Oct 61-Oct 62,
by R. R. Baldwin, Oct 62, 7p
Grant AF-EOAR-62-25
AFOSR-4297

Descriptors: (*Hydrogen, Reaction kinetics), (*Oxygen, Reaction kinetics), (*Hydrocarbons, Reaction kinetics), Inhibition, Explosions, Combustion, Carbon monoxide, Oxidation, Water vapor, Great Britain.

Research progress in the following areas is summarized: the inhibition of the hydrogen-oxygen reaction by hydrocarbons; the effect of carbon monoxide on the hydrogen-oxygen reaction in aged boric-acid-coated vessels; the water-sensitised oxidation of carbon monoxide.

AD-640 222 **Field 7D**
Not available from CFSTI.
California Univ., Berkeley.
COLLISION-INDUCED RELAXATION OF ORIENTED Rb87 ATOMS IN THE 5-DOUBLET-P1/2 STATE,
by Joseph Yellin, and Richard Marrus. 23 Dec 64, 3p
Grant AF-AFOSR-62-346
Proj. AF-9767
Task 976702
AFOSR-66-1562
Prepared for presentation at the Berkeley, Calif. Meeting of the American Physical Society, 21-23 December 1964. The document is comprised only of the abstract quoted below.
Availability: Published in Bull. Am. Phys. Soc. v9 p720 1964.

Descriptors: (*Rubidium, *Atomic energy levels), Excitation, Probability, Pumping (Optical), Helium, Argon, Neon, Transients.

Mixing of alkali excited states by collisions with a buffer gas has a pronounced effect on the structure of the optical-pumping transients. Cross sections for disorienting a Rb87 atom in the 5-doublet-P 1/2 state by collisions with helium, neon, and argon were determined from a study of optical-pumping transients. The cross sections are 1.2 (0.6) x 10 to the -17th, 5.0 (2.5) x 10 to the -17th, and 3.5 (1.7) x 10 to the -16th power cm sq. for helium, neon and argon respectively. The model used to obtain the cross sections and the errors involved is discussed. (Author)

AD-640 253 **Field 7D**
Not available from CFSTI.
California Univ., Berkeley. Dept. of Physics.

STUDY OF OPTICAL-PUMPING TRANSIENTS IN RUBIDIUM AND CESIUM VAPORS (ABSTRACT),
by Joseph Yellin, Richard Marrus, and W. A. Nierenberg. Mar 64, 3p UCRL-11351
Grant AF-AFOSR-62-346
Proj. AF-9767
Task 976702
AFOSR-66-1564
Availability: Published in Abstract from meeting of American Physical Society, Denver, Colo., Jun 25-27 1964.

Descriptors: (*Rubidium, Pumping (Optical)), (*Cesium, Pumping (Optical)), Vapors, Transients, Atomic energy levels, Excitation, Relaxation time.

The shape of optical-pumping transients in rubidium vapor were studied in detail. Observed transients can be separated into a sum of exponential components. These components are found to be in agreement with a theoretical model based on complete mixing in the excited state. From a study of the times of the individual components as a function of light intensity, relaxation times can be deduced. By using this method, the relaxation time of cesium vapor in a 200-ml Pyrex bulb with no buffer gas was measured to be Ti = 0.6 (i) msec. This corresponds to an average of 2.5 wall collisions before relaxation. (Author)

AD-640 302 **Field 7D, 7B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
CHARACTERISTICS OF HIGH TEMPERATURE REACTION OF CARBON WITH GASES,
by G. P. Khaustovich, and E. S. Golovina. 6 Apr 66, 12p FTD-TT-65-1671
TT-66-62440
Unedited rough draft trans. of Inzhenerno-Fizicheskii Zhurnal (USSR) v7 n3 p92-6 1964.

Descriptors: (*Carbon, Chemical reactions), (*Oxygen, Chemical reactions), (*Carbon dioxide, Chemical reactions), High-temperature research, Gases, Particles, Diffusion, Reaction kinetics, Density, USSR.

Presented are results of experimental investigation of reaction of spherical carbon particles with carbon dioxide and oxygen at temperatures of 2500-3200K. (Author)

AD-640 368 **Field 7D, 7A**
CFSTI Prices: HC$1.10 MF$0.50
Copenhagen Univ. (Denmark). Inst. for Physical Chemistry.
APPLICATION OF THE THEORY OF IRREVERSIBLE PROCESSES TO PROBLEMS OF DIFFUSION AND CHEMICAL REACTION.
Annual summary rept. no. 3, 1 Sep 60-31 Aug 61,
by Thor A. Bak. 25 Sep 61, 5p
Contract AF 61 (052)-133

Descriptors: (*Irreversible processes, Chemical reactions), (*Reaction kinetics, Irreversible processes), Diffusion, Brownian motion, Diatomic molecules, Dissociation, Potential theory, Harmonic generators, Denmark.

Identifiers: Particle interactions.

Research progress in the following areas is briefly summarized: derivation of the weak interaction master equation and its application to Brownian motion type phenomena (reported in detail in AD-261 155); vibrational energy transfer to a diatomic molecule (reported in detail in AD-297 987); dissociation of a harmonic oscillator in a hard sphere gas.

AD-640 385 **Field 7D, 21I**
CFSTI Prices: HC$1.10 MF$0.50
Hebrew Univ., Jerusalem (Israel). Dept. of Organic Chemistry.

INVESTIGATION OF CHEMICAL REACTIONS IN THE SOLID STATE.
Annual summary rept., 1 Sep 58-31 Aug 59,
by Saul Patai. 1 Sep 58, 4p
Contract AF 61 (052)-143

Descriptors: (*Oxidation-reduction reactions, Solids), (*Oxidizers, Chemical reactions), Organic compounds, Reaction kinetics, Polymers, Decomposition, Crosslinking (Chemistry), Israel.

A brief summary is given of work done on reactions in the solid state, between various solid organic compounds and different solid oxidizing agents. Details are reported in AD-236 992, AD-268 246, and AD-268 247.

AD-640 386 **Field 7D, 7A**
CFSTI Prices: HC$1.10 MF$0.50
Copenhagen Univ. (Denmark). Inst. for Physical Chemistry.
APPLICATION OF THE THEORY OF IRREVERSIBLE PROCESSES TO PROBLEMS OF DIFFUSION AND CHEMICAL REACTION.
Annual summary rept. no. 4, 1 Sep 61-30 Apr 63,
by Thor A. Bak. 30 Apr 63, 6p
Contract AF 61 (052)-133
See also AD-640 368.

Descriptors: (*Irreversible processes, Chemical reactions), (*Reaction kinetics, Irreversible processes), Exchange reactions, Quantum mechanics, Potential theory, Dissociation, Thermodynamics, Kinetic energy, Relaxation time, Denmark.

Identifiers: Particle interactions.

Research progress in the following areas is reported: A quantum mechanical theory for the exchange reaction 'A+BC yields ab+C'; the hard sphere model for dissociation reactions; the translational relaxation of a Lorentz gas of hard spheres.

AD-640 405 **Field 7D, 21I**
CFSTI Prices: HC$2.00 MF$0.50
IIT Research Inst., Chicago, Ill. Technology Center.
ADVANCED OXIDIZER CHEMISTRY.
Technical summary rept., 1 Apr-30 Jun 66,
by Irvine J. Solomon. 16 Aug 66, 33p IITRI-C227-16
Contract AF 49 (638)-1175
Proj. AF-9713
Task 971302
AFOSR-66-2056

Descriptors: (*Fluoborates, Chemical properties), (*Oxidizers, Chemistry), (*Oxygen compounds, *Fluorides), Tracer studies, Boron compounds, Nuclear magnetic resonance, Line spectrum, Intensity, Molecular structure.

Identifiers: Dioxygen tetrafluoroborate, Oxygen fluorides.

It was found by F18 tracer studies that the compound O2BF4 has the structure O2(:)BF4(-) and not BF3OOF of some other structure. Also, O2BF4 is probably soluble and unreactive in ultra pure HF. Studies of these solutions are being carried out. The O17 and F19 NMR spectra of O2F2 and what has been referred to as O3F2 were studied. The results for O2F2 were as expected: one fluorine line and one oxygen line. For O3F2 three O17 lines were observed; one of the three was shown to be due to O2F2 and the other two, which were of equal intensity, were attributed to O3F2. The F19 spectra of O3F2 consisted of two closely spaced lines and as in the O17 case one of these lines was attributed to O2F2. The NMR shows conclusively that what has been called O3F2 is truly a mixture of O2F2 and O4F2. (Author)

AD-640 473 **Field 7D, 7B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
COMPUTATION OF THE VIBRATIONAL FREQUENCIES OF A MOLECULE OF HYDRAZINE N2H4,
by Yu. I. Kotov, G. S. Koptev, and V. M. Tatevskii. 25 Apr 66, 9p FTD-TT-65-1900
TT-66-62462
Unedited rough draft trans. of Moscow Univ. Vestnik. Seriya 2: Khimiya (USSR) v18 n3 p10-3 1963.

Descriptors: (*Hydrazine, *Molecular spectroscopy), Chemical bonds, Vibration, Rotation, Stereochemistry, USSR.

Results are presented of calculations of the vibrational frequency of a hydrazine molecule for rotational angles of 0,60, 90, 120, and 180 degrees.

AD-640 512 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Redstone Scientific Information Center, Redstone Arsenal, Ala.
POTENTIOMETRIC INVESTIGATION OF THE OXIDATION OF FERROUS CHLORIDE BY OXYGEN.
by V. V. Lyulko. 15 Aug 66, 13p RSIC-582
TT-66-62466
Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Khimiya i Khimicheskaya Tekhnologiya (USSR) v5 n6 p911-5 1962.

Descriptors: (*Oxidation, Potentiometers), (*Iron compounds, *Chlorides), Oxygen, Catalysis, Catalysts, Hydrochloric acid, USSR.

Identifiers: Ferrous chloride.

The oxidation of ferrous chloride by oxygen proceeds very slowly at room temperature. The acceleration of this process and the study of its kinetics can be of great value in obtaining non-ferrous metals; this is the case when removing iron impurities from zinc concentrates. Discussed is the effect of various catalyzers and the effect of hydrochloric acid and iron chloride concentrations on the oxidation rate of bivalent Fe ions at room temperature. (Author)

ANL-7164 **Field 7D, 18D, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
DEVELOPMENT AND FABRICATION OF A BORON ABSORPTION TUBE FOR SPECTROGRAPHIC ANALYSIS,
by J. T. Dusek. Mar 66, 8p
Contract W-31-109-eng-38

Descriptors: (*Discharge tubes, *Spectrum analyzers).

For abstract, see N 20 19.

ANL-7165 **Field 7D, 9B**
CFSTI Prices: HC$5.00 MF$1.00
Argonne National Lab., Ill.
TABLES FOR THE CALCULATION OF OPERATING PARAMETERS FOR COMPOUND SOLVENT-EXTRACTION COLUMNS,
by Terry R. Johnson, and Nelda K. Clark. Feb 66, 157p
Contract W-31-109-eng-38

Descriptors: (*Solvent extraction, Data).

For abstract, see N 20 19.

IS-1335 **Field 7D**
CFSTI Prices: HC$4.25 MF$1.75
Iowa State Univ. of Science and Technology, Ames.
BIBLIOGRAPHY OF MASS SPECTROSCOPY LITERATURE, COMPILED BY COMPUTER METHOD,
by J. Capellen, H. J. Svec, and C. R. Sage. Mar 66, 399p
Contract W-7405-eng-82

Descriptors: (*Bibliographies, *Mass spectroscopy).

For abstract, see N 20 20.

LA-3332 **Field 7D, 11I**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
MEASUREMENT OF ALPHA PHASE PLUTONIUM IN PLUTONIUM-1 W/O GALLIUM ALLOY BY ELECTRICAL RESISTIVITY,
by J. W. Anderson, and R. R. Gilmore. Jan 65, 27p
Contract W-7405-eng-36

Descriptors: (*Plutonium, *Electrochemistry).

For abstract, see N 20 19.

LA-3491 **Field 7D, 6R, 18I**
CFSTI Prices: HC$3.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
CHARACTERISTICS OF THE AEROSOL PRODUCED FROM BURNING SODIUM AND PLUTONIUM,
by Harry J. Ettinger, William D. Moss, and Harold Busey. Feb 66, 49p
Contract W-7405-eng-36

Descriptors: (*Aerosols, Combustion products).

For abstract, see N 20 19.

LA-3501 **Field 7D, 7E**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
RADIATION DAMAGE PRODUCTION OF INTERSTITIAL DEFECTS IN IONIC HALIDE CRYSTALS,
by F. E. Pretzel, and J. L. Anderson. Oct 64, 38p
Contract W-7405-eng-36

Descriptors: (*Crystal lattice defects, *Radiation damage).

For abstract, see N 20 19.

LA-3503 **Field 7D, 7B**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
TRIBUTYL PHOSPHATE EXTRACTION OF URANIUM (VI) TRICHLOROACETATE,
by James S. Coleman, and Ronald C. Chisholm. Mar 66, 11p
Contract W-7405-eng-36

Descriptors: (*Solvent extraction, *Uranium compounds).

For abstract, see N 20 19.

LA-3509 **Field 7D, 20D**
CFSTI Prices: HC$4.00 MF$1.00
Los Alamos Scientific Lab., N. Mex.
A STUDY OF SOME OF THE PARAMETERS AFFECTING KNUDSEN EFFUSION, DEVIATIONS FROM THE COSINE LAW AS A FUNCTION OF CELL GEOMETRY, CELL MATERIALS, AND NATURE OF THE EFFUSING SPECIES,
by John W. Ward. Jan 66, 144p
Contract W-7405-eng-36

Descriptors: (*Kinetic theory, *Gas flow).

For abstract, see N 20 20.

NBS-Mono-25-Sec-4 **Field 7D, 20B**
CFSTI Prices: HC$0.55 MF$0.75
National Bureau of Standards, Washington, D. C.
STANDARD X-RAY DIFFRACTION POWDER PATTERNS.
by Howard E. Swanson, Marlene C. Morris, and Eloise H. Evans. 28 Jun 66, 88p
Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20402, $0.55.

Descriptors: (*X-ray diffraction analysis, Standards), (*Powder metallurgy, X-ray diffraction analysis), Powders, Crystal structure, Crystal lattices, Experimental data, Data.

Standard x-ray diffraction powder data are presented for 103 substances. Thirty-two of these patterns represent experimental data and 71 are calculated. Ten experimental patterns replace eleven cards already in the X-ray Powder Diffraction File published by the American Society for Testing and Materials; twenty-two experimental patterns and seventy-one calculated patterns are for substances not previously included in the File. The experimental x-ray powder diffraction patterns were made with a Geiger counter x-ray diffractometer, using samples of high purity. All d-values were assigned Miller indices determined by comparison with theoretical interplanar spacings and from space group extinctions. The densities and lattice constants were calculated, and the refractive indices were measured whenever possible. The calculated x-ray powder diffraction patterns were obtained from single crystal structure data. The reported peak height intensities for calculated patterns were converted from integrated intensities. Accurate cell determination measurements for the internal standards were obtained by using a flat-plate back reflection focusing camera.

N66-27233 **Field 7D**
CFSTI Prices HC$2.00 MF$0.50
National Bureau Of Standards, Washington, D. C. Electrochemistry Section.
A STUDY OF ELECTROCHEMICAL PROCESSES IN SILVER-CADMIUM SECONDARY CELLS.
by E. M. Otto. 14 Jul 65, 26p NASA-CR-62027
NASA ORDER S-70008-G

Descriptors: *Discharge, *Electrochemical cell, *Silver-cadmium battery, Battery, Cadmium, Cell, Characteristics, Charge, Concentration, Effect, Electrochemical, Electrolyte, Level, Secondary, Silver, Temperature.

For abstract, see S 04 15.

N66-27927 **Field 7D**
CFSTI Prices HC$1.00 MF$0.50
Florida Univ., Gainesville. Dept. Of Chemistry.
DETERMINATION OF ELECTRON AFFINITY DIFFERENCES BY SURFACE IONIZATION.
by C. S. Harden, E. E. Muschlitz Jr. and D. Stelman. 1966, 12p NASA-CR-75656
Grant NSG-67
Presented At The 14th Ann. Conf. On Mass Spectrometry, Dallas, May 1966 Submitted For Publication

Descriptors: *Halogen, *Molecular beam, *Surface ionization, *Tungsten, Affinity, Atom, Beam, Bond, Chlorine, Column, Dissociation, Fluorine, Hot, Ionization, Molecular, Strength, Surface, Temperature.

For abstract, see S 04 15.

N66-28176 **Field 7D**
CFSTI Prices HC$2.00 MF$0.50
Osterreichische Studiengesellschaft Fur Atomenergie G.m.b.h., Seibersdorf (Austria). Institut Fuer Chemie.
GAS CHROMATOGRAPHY RESEARCH OF VOEST ANTHRACENE OIL I.
Gaschromatographische Untersuchungen An Voest-anthrazenoel I
by E. Proksch, and W. Szinovatz. 1966, 29p
SGAE-CH-26/1966
In German, English Summary Submitted For Publication

Descriptors: *Anthracene, *Gas chromatography, *Oil, Boiling, Chromatography, Coal, Component, Ether, Gas, Point, Polyphenyl, Quinone, Resolution, Separation.

For abstract, see S 04 15.

N66-29362 **Field 7D**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
CHARGE-TRANSFER STATES IN ORGANIC SYSTEMS.
Sostoyaniya S Perenosom Zaryada V Organicheskikh Sistemakh
by V. A. Benderskiy, and L. A. Blyumenfeld. Apr 64, 8p NASA-TT-F-8848
Transl. Into English From Dokl. Akad. Nauk Sssr (Moscow), V. 144, No. 4, 1962 P 813-816

Descriptors: *Charge transfer, *Conjugated system, *Organic compound, *Polymer, Bond, Carrier, Charge, Chemistry, Compound, Conjugation, Current, Density, Electric, Electron, Energy, Level, Low, Magnetic, Molecular, Molecule, Organic, Photoconductivity, Property, Spin, State, System, Transfer.

For abstract, see S 04 16.

N66-29521 **Field 7D**
CFSTI Prices HC$2.00 MF$0.50
Vermont Univ., Burlington.
CHANGES IN PHOTOELECTRIC WORK FUNCTION OF MOLYBDENUM DUE TO ADSORPTION OF CARBON MONOXIDE.
by J. D. Clewley. Apr 66, 50p NASA-CR-75865
Grant NSG-241, Contract NGR-46-001-008

Descriptors: *Adsorption, *Carbon monoxide, *Molybdenum, *Photoelectricity, *Work function, Bombardment, Chemisorption, Dipole, Function, Ion, Layer, Measurement, Physics, Surface, Work.

For abstract, see S 04 16.

N66-29707 **Field 7D**
CFSTI Prices HC$2.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
A FORECAST FOR THEORETICAL CHEMISTRY.
by J. O. Hirschfelder. 28 Mar 66, 38p NASA-CR-75985, WIS-TCI-171
Grant NSG-275-62
Presented At Am. Chem. Soc. Meeting, Pittsburgh, 28 Mar. 1966

Descriptors: *Chemistry, *Molecular structure, *Quantum mechanics, Atom, Bond, Computer, Energy, Group, Mechanics, Molecule, Orbit, Quantum, Statistics, Structure, Theory.

For abstract, see S 04 16.

N66-29867 **Field 7D**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Lewis Research Center, Cleveland, Ohio.
SHOCK-TUBE INVESTIGATION OF BROMINE DISSOCIATION RATES IN PRESENCE OF ARGON, NEON, AND KRYPTON.
by M. Warshay. Jul 66, 26p NASA-TN-D-3502

Descriptors: *Bromine, *Dissociation, *Gas mixture, *Shock tunnel, Argon, Drive, Gas, Glass, Halogen, Incidence, Krypton, Mixture, Neon, Rate, Recombination, Section, Shock, Tube.

For abstract, see S 04 16.

N66-35732 **Field 7D**
CFSTI Prices HC$1.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
THE CUSP CONDITIONS FOR MOLECULAR WAVE FUNCTIONS.
by J. O. Hirschfelder, and R. T. Pack. 5 Nov 65, 25p NASA-CR-68758, WIS-TCI-123
Grant NSG-275-62

Descriptors: *Coulomb potential, *Diatomic molecule, *Wave function, Chemistry, Coalescence, Cusp, Diatomic, Function, Molecule, Node, Particle, Singularity, Theoretical, Wave.

For abstract, see S 04 21.

N66-35800 **Field 7D**
CFSTI Prices HC$1.00 MF$0.50
Harvard Coll. Observatory, Cambridge, Mass. Shock Tube Spectroscopy Lab.
ON THE 6S6P2 2 S1/2 LEVEL AND THE CONFIGURATION-MIXING OF THE 6S6P2 4 P3/2 LEVEL IN T1 I SCIENTIFIC REPORT NO. 11.
by W. R. Garton, W. H. Parkinson, and E. M. Reeves. May 66, 15p NASA-CR-77639
Grant NSG-438, Contract NONR-1866/48/

Descriptors: *Absorption spectrum, *Shock heating, *Thallium, *Vapor, Absorption, Furnace, Heating, Monochromator, Resonance, Scanning, Shock, Spectrum, Tube.

For abstract, see S 04 21.

N66-36051 **Field 7D**
CFSTI Prices HC$1.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge.
THE DETECTION AND IDENTIFICATION OF ORGANIC MATTER BY MASS SPECTROMETRY TECHNICAL PROGRESS REPORT, 16 JUN. 1965 - 15 JUN. 1966.
1966, 18p NASA-CR-77873
Grant NSG-211-62

Descriptors: *Extraterrestrial matter, *Identification, *Mass spectrometry, *Organic compound, *Trace contaminant, Chromatography, Compound, Computer, Contaminant, Detection, Extraterrestrial, Gas, Instrumentation, Mass, Matter, Meteorite, Organic, Separation, Spectrometry, Technique, Terrestrial, Trace.

For abstract, see S 04 21.

N66-36136 **Field 7D**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
ADSORPTION OF BARIUM ATOMS AND BARIUM OXIDE MOLECULES ON TUNGSTEN, II.
Adsorbtsiya Atomiv Bariyu I Molekul Okisu Bariyu Na Vol'frami, Ii
by V. M. Gavrilyuk. Aug 66, 32p NASA-TT-F-10275
Transl. Into English From Ukr. Fiz. Zh. (Kiev), V. 4, No. 6, 1959 P 734-749

Descriptors: *Adsorption, *Barium oxide, *Metal surface, *Work function, Atom, Barium, Electrostatic, Exchange, Formulation, Function, Heat, Interaction, Metal, Molecule, Oxide, Surface, Tungsten, Work.

For abstract, see S 04 21.

ORNL-3960 **Field 7D, 18D**
CFSTI Prices: HC$3.00 MF$0.75
Oak Ridge National Lab., Tenn.
DATA COLLECTION AND EVALUATION WITH AN X-RAY DIFFRACTOMETER DESIGNED FOR THE STUDY OF LIQUID STRUCTURE.
by H. A. Levy, M. D. Danford, and A. H. Narten. Jul 66, 61p
Contract W-7405-eng-26

Descriptors: (*X-ray diffraction analysis, Instrumentation).

For abstract, see N 20 19.

PB-170 931 Field 7D, 20I
CFSTI Prices: HC$1.60 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ANALYSE AUTOMATIQUE DE SPECTRES DE GAUSSIENNES (Automatic Analysis of Gaussian Peak Spectra),
by Jean Picard. May 66, 20p CEA-R-3024
Text in French; Summary in English.

Descriptors: (*Nuclear spectroscopy, Programming (Computers)), (*Spectroscopy, Programming (Computers)), Statistical distributions, Analysis, Automatic, France.

A FORTRAN IV program for automatic analysis of spectra with peaks roughly gaussians. (Author)

PB-173 178 Field 7D, 7B
CFSTI Price: HC$3.60
James Forrestal Research Center, Princeton Univ., N. J.
VIBRATIONAL RELAXATION TIMES BY THE IMPACT TUBE METHOD - I. EXTENSION OF METHOD TO LONG RELAXATION TIME RANGE. II. INVESTIGATION OF THE OXYGEN-D20, OXYGEN-H20 SYSTEMS,
by C. S. Tuesday, and M. Boudart. Jan 55, 66p
Technical note TN-7
Contract AF 33 (038)-23976
AFOSR-TN-55-67, AD-57 918

Descriptors: (*Relaxation time, *Oxygen), (*Pitot tubes, Relaxation time), Water, Heavy water, Nozzle gas flow, Compressible flow.

The theory of the impact tube method is discussed and the general equations derived. The compressible flow solution for expansion is derived and used to obtain a general solution of the equation. Special cases of the general solution are considered and the invalidity of the assumption of incompressible nozzle flow is demonstrated. Numerical solutions of the equations are given and used in an investigation of the influence of H2O and D2O on the vibrational relaxation time of oxygen. The results for the H2O-oxygen system are found to agree with the results obtained using sonic methods thus establishing the validity of the treatment. H2O is shown to be much more effective in transferring vibrational energy from oxygen than D2O. This is attributed to the near resonance in vibrational levels of oxygen and H2O which results in resonance vibrational energy exchange. This concept is utilized in a proposed mechanism which satisfactorily explains the experimental results.

PB-173 236 Field 7D
CFSTI Prices: HC$7.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ETUDE DES SECTIONS EFFICACES DE DOUBLE ECHANGE DE CHARGES D'IONS H (+), D (+), Li (+) TRAVERSANT DIFFERENTS GAZ ORGANIQUES DANS UNE GAMME D'ENERGIE COMPRISE ENTRE 10 et 50 KeV (Study of the Double Charge-Changing Collision Cross-Sections of H (+), D (+), Li (+) IONS With Organic Molecules in the Energy Range 10-50 KeV).
Doctoral thesis.
by Samad Farrokhi. 1966, 78p CEA-R-2952
Text in French; Attached summary in English.

Descriptors: (*Ion bombardment, *Exchange reactions), (*Aliphatic compounds, Ion bombardment), Dissociation, Ionization, Methane, Ethanes, Propanes, Butane, Probability, Hydrogen, Deuterium, Lithium, France.

The variation of the double charge-changing collision cross-sections of H (+), D (+), Li (+) ions with organic molecules (CH4, C2H6, C3H8, C4H10) in the energy range 10-50 keV was studied. Several maximums for sigma sub 1-1 = f (E) were shown. Their existence should be explained by the different possibilities of dissociating the target-molecules. The position of the maximums for the H (+), to H (-) and D (+) to D (-) reactions is in good agreement with that defined by the Massey's adiabatic relation. (Author)

UCRL-16869 Field 7D, 18D
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.
SOLID-STATE COUNTERS FOR IMMEDIATE ANALYSIS DURING COLUMN CHEMISTRY,
by James T. Haley, Robert J. Walker, and Tommy R. Corbin. 12 May 66, 11p
Contract W-7405-eng-48

Descriptors: (*Radiation counters, Chemical analysis).

For abstract, see N 20 19.

Y-1542 Field 7D
CFSTI Prices: HC$2.00 MF$0.50
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
DETERMINATION OF ALUMINUM, SILICON, IRON, URANIUM, AND THORIUM IN BERYLLIUM BY X-RAY FLUORESCENCE,
by G. E. Walden, and Alma D. Condrey. 19 Jul 66, 20p
Contract W-7405-eng-26

Descriptors: (*Beryllium, *X-ray spectroscopy).

For abstract, see N 20 19.

AD-483 745 See Field 20I

AD-639 663 See Field 11F

AD-639 685 See Field 7C

AD-639 756 See Field 20I

AD-639 860 See Field 11F

AD-639 872 See Field 8L

AD-639 873 See Field 8L

AD-639 934 See Field 20J

AD-639 935 See Field 20J

AD-640 084 See Field 21I

AD-640 148 See Field 20D

AD-640 171 See Field 20L

AD-640 179 See Field 7C

AD-640 211 See Field 21B

AD-640 223 See Field 18B

AD-640 224 See Field 18B

AD-640 226 See Field 20L

AD-640 228 See Field 20D

AD-640 244 See Field 20D

AD-640 286 See Field 11I

AD-640 388 See Field 20J

AD-640 389 See Field 20J

AD-640 445 See Field 20D

AD-640 471 See Field 21I

AD-640 485 See Field 5A

AD-640 514 See Field 20L

AD-640 525 See Field 19D

PB-170 932 See Field 7B

PB-173 245 See Field 18F

7E. RADIO AND RADIATION CHEMISTRY

AD-639 701 Field 7E, 7B, 6
CFSTI Prices: HC$2.00 MF$0.50
Marks Polarized Corp., Whitestone, N. Y.
DEVELOPMENT OF AN INORGANIC PHOTOTROPIC SYSTEM FOR FLASHBLINDNESS PROTECTION.
Technical rept.,
by Alvin M. Marks. Jul 66, 46p
Contract DA-19-129-AMC-158 (N)
Proj. DA-1K6-43303-D547
USA-NLABS-TR-67-2-CM, C/OM-22

Descriptors: (*Photochromism, *Inorganic acids), (*Flashblindness, Photochromism), Potassium compounds, Arsenic compounds, Molybdates, Molybdic acids, Vanadates, Boron compounds, Tungstates, Films, Chromatographic analysis, Optical properties.

Identifiers: Arsenomolybdic acids, Borotungstic acid, Heteropoly acids, Potassium arsenomolybdates, Phosphomolybdic acids, Purpureo phosphovanadic acids, Phototropic materials.

The report presents the details of a study made to determine the feasibility of using films containing one or more heteropoly acids for possible protection against flashblindness. Phosphomolybdic, phosphovanadomolybdic, phosphotungstic, silicotungstic, and silicomolybdic acids were evaluated. Methods for the preparation and purification of heteropoly acids in general are given. Also given are details for the preparation and purification of specific compounds: potassium-arseno-12-molybdate, phospho-18-molybdic acid, arseno-12-molybdic acid, purpureophospho-12-vanadic acid, and borotungstic acid. Films for evaluating the photochromic response were prepared by centrifugally spinning a thin film of acid-resin solution on a polyester substrate and evaporating the solvent. Photochromic response and capabilities were determined by (1) exposing the films to a xenon flash, an ultraviolet lamp, and a xenon-mercury arc; and (2) measuring the optical transmission or density before and after exposure. The response of several films, particularly phosphomolybdic acid in polyvinyl acetate (which changed from an optical density of 0.07 to a density of 3.4), indicates that further research in this area is warranted. Also, since several of the films were somewhat heat sensitive, a study of different resins in indicated. (Author)

AD-639 741 Field 7E
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
XENON-SENSITIZED RADIOLYSIS OF PROPANE,
by L. I. Bone, L. W. Sieck, and J. H. Futrell. 13 Dec 65, 8p ARL-66-0175
Proj. AF-7023
Availability: Published in The Journal of Chemical Physics v44 n10 p3667-72 May 15 1966.

Descriptors: (*Propanes, *Radiochemistry), (*Xenon, Radiochemistry), Ions, Free radicals, Deuterated compounds, Disproportionation, Decomposition, Reaction kinetics, Volumetric analysis.

The xenon-sensitized radiolysis of propane was investigated in the presence and absence of small amounts of ion and free radical interceptors. From an analysis of mixtures of deuterated propanes and a knowledge of radical disproportionation yields

in the scavenged and unscavenged systems it is possible to construct a complete quantitative kinetic analysis for the decomposition. Ion titration methods demonstrate that the neutralization of C3H7 (+) ions occurs heterogeneously in the system investigated and leads quantitatively to the production of equivalent yields of isopropyl radicals and hydrogen atoms. (Author)

AD-639 939 **Field 7E, 7C**
CFSTI Prices: HC$7.60 MF$0.75
Uppsala Univ. (Sweden). Inst. of Physical Chemistry.
HIGH INTENSITY PHOTOLYSIS STUDIES OF ACETONE AND SOME ALIPHATIC ALDEHYDES,
by Gunnar Wettermark. 12 Apr 61, 79p
Contract AF 61 (052)-70
AFOSR-TN-59-682
Published in Arkiv for Kemi v18 n1 79p Apr 12 1961.

Descriptors: (*Acetones, Photolysis), (*Aldehydes, Photolysis), (*Photolysis, Aliphatic compounds), Gas chromatography, Carbon monoxide, Alkanes, Organic oxygen compounds, Hydrogen, Free radicals, Reaction kinetics, Sweden.

Identifiers: Acetaldehydes, Butyraldehydes, Propionaldehydes, Quantum yield.

The vapour phase photolysis of acetone, acetaldehyde, propionaldehyde, n-butyraldehyde and isobutyraldehyde has been investigated at very high light intensities. Analyses for all major products were made on samples which were exposed to unfiltered light in a cylindrical reaction vessel. In the present case 1800 joules were discharged in this apparatus, giving absorbed intensities of the order of 10 to the 25th power quanta/sec/litre with a flash period of 10 microsec. The stoichiometry of the products showed that all important constituents were measured. By using a very intense point-discharge, quantum yields for the formation of the main products were determined in parallel light. The samples absorbed light in the absorption band around 280 millimicrons. Flashes of 100,000 joules, which gave absorbed intensities of the order of 10 to the 23rd power quanta/sec/litre were used throughout. The product yields were determined by means of gas chromatography using a flame ionization detector or a high sensitivity thermal conductivity detector.

AD-639 946 **Field 7E, 6Q**
CFSTI Prices: HC$1.00 MF$0.50
TRW Systems, Redondo Beach, Calif. Quantum Physics Lab.
RESEARCH ON TRIPLET STATES AND PHOTOCHROMISM.
Semi-annual Research rept. no. 5, 25 Jan-30 Sep 64,
by D. Weber, and M. W. Windsor. 30 Sep 64, 23p

Contract AF 41 (609)-2425
See also AD-434 239.

Descriptors: (*Optical filters, Photochromism), (*Photochromism, *Molecular energy levels), (*Aromatic compounds, Photochromism), Band spectrum, Polycyclic compounds, Acrylic resins, Photosensitivity, Epoxy plastics, Fluorescence, Flashblindness, Materials.

Identifiers: Chrysenes.

The report describes research studies on the photochromic properties of the triplet states of aromatic compounds for application to the problem of flash blindness protection. Effort was concentrated on the measurement of optical densities attained as a function of flash energy, since it is this parameter which is of greatest importance for evaluating materials for flash protection. An OD of 2 was obtained for a chrysene sample with a flash energy of 380J. Several pairs of compounds appear promising in providing broad coverage on the basis of curves constructed by adding together their T-T absorption spectra. Fatigue studies on chrysene in PMM plastic show that the samples withstand four weeks exposure to sunlight without noticeable fatigue but that the T-T absorption has decreased by about a factor of 2 or 3 after eight weeks exposure. The core effect, previously attributed to quenching by the diffusion of atmospheric oxygen into the plastic has been shown to be reversible when samples are pumped in vacuum while being either heated or irradiated with a sun lamp. A clear epoxy plastic has been developed in which the solubility of chrysene is 1/10 sq M. This may lead to thinner photochromic specimens. Fluorescence yields of more than a dozen aromatics were measured. (Author)

AD-639 947 **Field 7E, 6Q**
CFSTI Prices: HC$4.60 MF$0.50
TRW Space Technology Labs., Inc., Redondo Beach, Calif.
RESEARCH ON TRIPLET STATES AND PHOTOCHROMISM.
Semi-annual research rept. no. 1, 1 Dec 61-31 May 62,
by Maurice W. Windsor. 31 May 62, 47p
Contract AF 41 (609)-1457
Proj. AF-7753

Descriptors: (*Optical filters, Photochromism), (*Photochromism, *Molecular energy levels), Photolysis, Instrumentation, Infrared spectroscopy, Absorption spectrum, Phosphorescence, Glass, Plastics, Optical materials, Spectrophotometers, Electron transitions, Flashblindness, Materials.

A flash photolysis apparatus with spectrographic recording was assembled. Using carefully degassed solutions, T-T absorption spectra have been recorded for several compounds out as far as 9000A. Several new bands in the near infra-red were discovered. Available data on spectra, extinction coefficients and lifetimes were collected from the literature and tabulated. Several compounds were investigated for phosphorescence activity in organic glasses at liquid nitrogen temperatures. A technique was developed for preparing optical quality plastic samples in which triplet state compounds are incorporated. The plastic samples can be machined to desired shapes and polished to optical standards. A theoretical study of radiationless transitions in complex molecules commenced. Application of the theory in a very elementary form yields the correct relative rates for the three most important intramolecular energy transfer processes in complex molecules. (Author)

AD-639 948 **Field 7E, 6Q**
CFSTI Prices: HC$4.60 MF$0.50
TRW Space Technology Labs., Inc., Redondo Beach, Calif.
RESEARCH ON TRIPLET STATES AND PHOTOCHROMISM.
Semi-annual research rept. no. 3, 1 Jan-31 Jul 63,
by Maurice W. Windsor. 31 Jul 63, 49p
Contract AF 41 (609)-1457
Proj. AF-7753
See also AD-600 218.

Descriptors: (*Optical filters, Photochromism), (*Photochromism, *Molecular energy levels), (*Aromatic compounds, Photochromism), Organic oxygen compounds, Absorption spectrum, Spectrophotometers, Ground state, Polycyclic compounds, Plastics, Fatigue (Mechanics), Flashblindness, Materials.

Identifiers: Chrysenes, Naphthocoronenes.

The report describes research studies on the photochromic properties of the triplet states of aromatic compounds and their application to the problem of eye-protection against nuclear weapons. Several oxygen-substituted derivatives of the most promising aromatic hydrocarbons investigated to date were obtained and their T-T absorption spectra studied. Two of the four compounds studied appear promising in termsof spectral coverage and photochemical stability. For one compound, naphthocoronene, a extinction coefficient value of 200,000 was obtained. This is an encouragingly high figure and comparable to the value calculated as being necessary to provide protection against flash blindness. Plastic specimens up to 1 inch in diameter and of excellent optical quality can now be made routinely. In a preliminary study of fatigue, a plastic specimen containing chrysene showed no evidence of fatigue after exposure to 50 high-intensity flashes of light.

AD-640 243 **Field 7E**
CFSTI Prices: HC$1.00 MF$0.50
Ohio State Univ., Columbus. Dept. of Chemistry.
PHOTOCHEMICAL GENERATION OF DIVALENT CARBON DERIVATIVES.
Final rept., 1 Feb 65-31 Aug 66,
by Albert Padwa. 31 Aug 66, 5p 1975-2
Grant AF-AFOSR-820-65
Proj. AF-9762
Task 976203
AFOSR-66-1933

Descriptors: (*Alkenes, *Photochemistry), Synthesis (Chemistry), Acetophenones, O-heterocyclic compounds, S-heterocyclic compounds, Photolysis.

Identifiers: Carbenes, Diazo acetophenones, Episulfides, Epoxides.

A brief summary is given of the results of studies involving the generation of bivalent carbon derivatives by photochemical transformations of alpha-diazo acetophenone, beta, gamma-acyloxides, and episulfides. The work was reported in detail in AD-629 833, AD-629 834, and AD-629 835.

DP-1009 **Field 7E, 18B, 7A**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont De Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
CURIUM PROCESS DEVELOPMENT. I. GENERAL PROCESS DESCRIPTION,
by I. Dwaine Eubanks, and Glenn A. Burney.
Apr 66, 22p
Contract AT (07-2)-1

Descriptors: (*Curium, *Chemical engineering).

For abstract, see N 20 19.

MLM-1299 **Field 7E, 18B, 20H, 18F**
CFSTI Prices: HC$2.00 MF$0.50
Mound Lab., Miamisburg, Ohio.
MOUND LABORATORY PROGRESS REPORT FOR SEPTEMBER 1965,
by J. F. Eichelberger, G. R. Grove, and L. V. Jones. 21 Sep 65, 31p
Contract AT (33-1)-GEN-53

Descriptors: (*Radiochemistry, *Isotope separation).

For abstract, see N 20 19.

MLM-1300 **Field 7E, 18D, 18B**
CFSTI Prices: HC$2.00 MF$0.50
Mound Lab., Miamisburg, Ohio.
MOUND LABORATORY PROGRESS REPORT FOR OCTOBER 1965,
by J. F. Eichelberger, G. R. Grove, and L. V. Jones. 20 Oct 65, 27p
Contract AT-33-1-GEN-53

Descriptors: (*Radiochemistry, *Isotope separation).

For abstract, see N 20 19.

N66-28218 **Field 7E**
CFSTI Prices HC$1.00 MF$0.50
Osterreichische Studiengesellschaft Fur Atomenergie G.m.b.h., Seibersdorf (Austria).
THE DETERMINATION OF IODINE IN TOTAL SERUM AND IN ALBUMIN SERUM WITH NEUTRON ACTIVATION ANALYSIS.

Zur Bestimmung Von Jod Im Gesamtserum Und Im Serumeiweiss Mit Der Neutronenaktivierungs-Analyse
by H. Altmann, and H. Frischauf. 1966, 10p
SGAE-BL-18/1966
In German Presented At 7th Intern. Symp. On Radioactive Isotopes In Medicine And Research, Bad Gastein, Austria Submitted For Publication

Descriptors: *Albumin, *Iodine, *Neutron activation, *Serum, Activation, Analysis, Benzene, Biological, Burn, Chemical, Gamma, Material, Neutron, Oxygen, Phase, Precipitation, Spectrometer, Tissue.

For abstract, see S 04 15.

N66-35785 **Field 7E**
CFSTI Prices HC$2.00 MF$0.50
Miami Univ., Coral Gables, Fla. Inst. Of Molecular Evolution.
RADIATION AND THE FIRST BIOPOLYMERS.
by S. W. Fox. 1966, 34p NASA-CR-77588
Grant NSG-689
Presented At The Symp. On Radiation And The Origin Of Life Of The 3d Intern. Congr. Of Radiation Res., Cortina D'ampezzo, Italy, 28 Jun. 1966

Descriptors: *Amino acid, *Biological cell, *Peptide, *Polynucleotide, *Radiation effect, Acid, Amino, Biology, Bond, Cell, Effect, Formation, Life, Polymer, Protein, Radiation, Thermodynamics.

For abstract, see S 04 21.

ORNL-3931 **Field 7E, 9B, 18G**
CFSTI Prices: HC$3.00 MF$0.50
Oak Ridge National Lab., Tenn.
PHOEBE A CODE FOR CALCULATING BETA AND GAMMA ACTIVITY AND SPECTRA FOR 235 U FISSION PRODUCTS,
by F. D. Arnold. Jul 66, 64p
Contract W-7405-eng-26

Descriptors: (*Programming (Computers), *Fission product activity).

For abstract, see N 20 19.

PB-169 614 **Field 7E, 18J, 7B**
CFSTI Prices: HC$1.10 MF$0.50
Production Group, United Kingdom Atomic Energy Authority, Sellafield (England).
ANALYTICAL METHOD FOR THE ABSORPTIOMETRIC DETERMINATION OF COPPER IN ENRICHED URANIUM METAL (2.2' DIQUINOLYL METHOD).
1965, 6p PG-665 (W)

Descriptors: (*Uranium, Chemical analysis), (*Copper, Microanalysis), Quinolines, Solvent extraction, Complex compounds, Chemical precipitation, Absorption spectrum, Great Britain.

Identifiers: Biquinolines, Sequestering agents.

Copper is determined absorptiometrically as the copper (I) 2.2' diquinolyl complex after extraction into amyl alcohol. The method is designed for the routine inspection of enriched uranium ingots: it is of value where the amount of available sample is strictly limited. (Author)

PB-170 912 **Field 7E, 18J**
CFSTI Prices: HC$8.60 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
CONTRIBUTION A L'ETUDE DES SOLUTIONS DE SELS D'URANYLE DANS LES PHOSPHATES BUTYLIQUES (Contribution to the Study of Uranyl Salts in Butyl Phosphate Solutions).
Doctoral thesis in French,
by Alain Coulon. 1966, 90p CEA-R-2882
Text in French; Attached Summary in English.

Descriptors: (*Solvent extraction, Uranyl Radicals), (*Uranyl radicals, Spectra (Infrared)), (*Organic phosphorus compounds, Solvent extraction), Phosphates, Nitrates, Chlorides, Acetates, Complex compounds, Band spectrum, Chemical precipitation, Synthesis (Chemistry), Chemical analysis, Solutions, Reactor fuel processing, France.

Identifiers: Tributyl phosphates, Triethyl phosphates, Trimethyl phosphates, Uranyl acetate, Uranyl chloride, Uranyl nitrate.

A spectroscopic study in the normal infra-red region and involving the following associations : trialkyl phosphates (tri-butyl, tri-ethyl, tri-methyl), uranyl salts (nitrate, chloride, acetate), confirmed the existence of an interaction between the phosphoryl group and the uranium atom, as shown by a movement of absorption band for the valency P = O from approx. 1270/cm to approx. 1180/cm. A study of the preparation, analysis and spectroscopy of the solids obtained by the precipitation of uranyl salts by acid butyl phosphates was carried out. Infra-red spectrophotometry demonstrated that the tri-butyl and di-butyl phosphates are associated in non-polar diluents even before the uranium is introduced. The extraction of uranyl salts from acid aqueous solutions by a diluted mixture of tri-butyl and di-butyl phosphates proceeds by different mechanisms according to the nature of the ion (nitrate or chloride). (Author)

PB-170 919 **Field 7E**
CFSTI Prices: HC$1.60 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
DOSAGE DU FER DANS LE PLUTONIUM PAR EXTRACTION DU COMPLEXE Fe II - BATHOPHENANTHROLINE (Determination of Iron in Plutonium by Extraction of the Fe (II)= Bathophenanthroline complex),
by Bernard Pichotin, and Philippe Chasseur. Jun 66, 17p CEA-R-2969
Text in French; Summary in English.

Descriptors: (*Plutonium, Chemical analysis), (*Iron, Microanalysis), (*Complex compounds, *Polycyclic compounds), Solvent extraction, Chemical precipitation, N-heterocyclic compounds, Spectroscopy, France.

Identifiers: Diphenyl phenanthrolines, Sequestering agents.

The report describes a method to determine micro quantities of iron in plutonium, by extraction with hexyl alcohol of the complex that give iron (II) with bathophenanthroline (4,7 diphenyl - 1, 10 phenanthroline). The reagent was applied to the determination of amounts of iron ranging from 1 to 10 micrograms in 20 ml of solvent. The determination is made by spectrophotometry at 530 millemicrons. Others cations present do not interfere. (Author)

PB-170 920 **Field 7E**
CFSTI Prices: HC$6.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
REALISATION D'UNE JAUGE A FLUORESCENCE BETA-X POUR L'ANALYSE CHIMIQUE (Construction of a Beta-X Fluorescence Gauge for Chemical Analysis),
by Ioannis Leontiadis. Jun 66, 66p CEA-R-2970
Text in French; Summary in English.

Descriptors: (*X rays, *Fluorescence), (*Beta decay, Radiochemistry), (*Chemical analysis, Instrumentation), Radioactive isotopes, Photoelectric effect, Intensity, Thickness, Radioactivation analysis, France.

A theoretical and experimental study was made of phenomena occurring when beta radiation from a radio-active source causes X-fluorescence in the atoms of a sample. A semi-empirical equation is put forward for calculating the intensity of the photo-electric peaks caused by the elements wh are being determined. The set-up proposed h a much better performance than that of previo Beta-X equipment. It is now possible to apply th new method both to chemical determinations a to layer-thickness measurements. The process h proved to be slightly more satisfactory than th using tritium-on-zirconium sources for produci X excitation. An extension of this work is pr posed for the case where the matrix effects a taken into account for determining the conten (Author)

PB-170 926 **Field 7E, 6R, 7**
CFSTI Prices: HC$1.60 MF$0.50
Commissariat a l'Energie Atomique, Fontena aux-Roses (France). Centre d'Etudes N cleaires.
METHODE SIMPLIFIEE DE DOSAGE D STRONTIUM 90 SUR DES QUANTITES IMPOR TANTES DE CENDRES D'OS (Simplified Meth for the Determination of Strontium-90 in Large Am ounts of Bone-Ash),
by Francios Patti, and Lucien Jeanmaire. Jun 66, 12p CEA-R-2998
Text in French; Summary in English.

Descriptors: (*Bone, Strontium), (*Strontiu Chemical analysis), Concentration (Chemi try), Chemical precipitation, Yttrium, Separa tion, Nitric acid, France.

Principle of the determination: (1) concentratio of the strontium by attacking the ash with nitr acid; (2) elimination of residual phosphoric ion by a double precipitation of strontium oxalate; (extraction of yttrium 90, counted in the oxala form. Advantages of the method: using simpl techniques it makes it possible to treat 50 ge o ash; the initial concentration of the strontium con siderably reduces the volume of the solutions a well as the size of precipitates handled; fuming n tric acid is used in a specially designed buret (Author)

PB-170 930 **Field 7E, 7**
CFSTI Prices: HC$3.60 MF$0.50
Commissariat a l'Energie Atomique, Fontena aux-Roses (France). Centre d'Etudes N cleaires.
REDUCTION ELECTROLYTIQUE DU PROTAC TINIUM PENTAVALENT (The Electroreductio of Protactinium Pentavalent),
by Claude Musikas. May 66, 32p CEA-R-3023
Text in French; Summary in English.

Descriptors: (*Protactinium, Reductio (Chemistry)), Electrochemistry, Sulfuric acid Hydrochloric acid, Volumetric analysis, Po larographic analysis, France.

The reduction of pentavalent protactinium to tetravalent protactinium, in sulfuric and hydrochlori media, on a milligram scale has been made by elec trolysis in a separated compartments cell. No indi cation allows to think that protactinium may exis at the trivalent state in these solutions. Beside polarogramms in fluoride solutions show only on reduction wave. The principle of a volumetri method for the titration of protactinium is given (Author)

PB-173 237 **Field 7E, 7C**
CFSTI Prices: HC$6.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
CONTRIBUTION A L'ETUDE DE LA L'ETUDE DE LA STRUCTURE ET DE LA REACTIVITE DES CETONES PAR UTILISATION DE LA SUBSTITUTION DEUTERIEE DES HYDROGENES ALPHA-CETONIQUES (Contribution to the Study of the Structure and Reactivity of Ketones Using Deuterium Substitution of the Alpha-Ketone Hydrogens).
Doctoral thesis,
by Gerard Frejaville. 17 Feb 66, 70p CEA-R-2955
Text in French; attached summary in English.

Descriptors: (*Ketones, *Deuterated compounds), Molecular structure, Chemical reactions, Molecular isomerism, Spectra (Infrared), Synthesis (Chemistry), Acetones, Chlorine compounds, Cyclohexanones, Substitution reactions, France.

Identifiers: Chloro cyclohexanones.

This work is an attempt to obtain more knowledge about the structure and the reactivity of ketones; it is also a contribution to conformational analysis based on infra-red signals associated with the C-D vibration in mono-deuterated compounds. The various dosage and synthetic methods used in this work are described. The infra-red spectra in the 2100-2200/cm region for mono-deuterated ketones are interpreted on the basis of a simple model. This model is then studied in detail, and also critically and precisely, in the case of the monodeuterated acetone molecule. Studies of the mechanism of the FAWORSKII reaction are reported and the reactivity of all the alpha-ketonic hydrogens of 2 chloro-cyclohexanone are classified. A counter-current exchange method for obtaining a great variety of solvents and deuterated pure raw materials under advantageous conditions is described. (Author)

AD-639 721 **See Field 6C**

AD-640 299 **See Field 20C**

LA-3501 **See Field 7D**

8A. BIOLOGICAL OCEANOGRAPHY

AD-639 722 **Field 8A, 8J, 8C**
CFSTI Prices: HC$2.00 MF$0.50
Woods Hole Oceanographic Institution, Mass.
ATLANTIC OCEANOGRAPHY CONDUCTED DURING THE PERIOD JANUARY 1, 1966 - JUNE 30, 1966.
Periodic status rept.,
by J. W. Cooper. 30 Jun 66, 50p WHOI-Ref-66-48
Contract Nonr-2196 (00)
Proj. NR-083-004

Descriptors: (*Oceanology, *Atlantic Ocean), Ocean currents, Gulf Stream, Sea water, Physical properties, Oceanographic vessels, Marine biology, Marine geology, Marine meteorology, Airborne.

Basic research in oceanography during the period is reported. Physical oceanography, buoy technology, marine biology, marine geology, and chemical oceanography are discussed. Ship and aircraft use, a list of publications resulting from the research are also reported. (Author)

AD-640 412 **Field 8A, 8J, 8G**
Not available from CFSTI.
Washington Univ., Seattle. Dept. of Oceanography.
A COMPILATION OF ARTICLES REPORTING RESEARCH.
Technical repts.
Sep 65, 106p WU-Ref-M65-36, TR-127-132
Contracts Nonr-477 (10), Nonr-477 (37)
Proj. NR-083-012
Partially sponsored by AEC Contracts AT (45-1)-540 and AT (45-1)-1725.
Availability: Published in various journals noted below.

Descriptors: (*Oceanology, Scientific research), Marine biology, Foraminifera, Crustacea, Bathythermograph data, Ocean bottom sampling.

Contents: Benthonic Foraminifera of the Chukchi Sea; by Susan C. Cooper. Contributions from the Cushman Foundation for Foraminiferal Research, vol. 15, pt. 3, pp. 79-104, July 1964. Seven Species of Eurytemora (Copepoda) From Northwestern North America; by Gayle A. Heron. Crustaceana, vol. 7, pt. 3, pp. 199-211, September 1964. Major Bathymetric Features Near the Coast of Oregon, Washington, and Vancouver Island; by Dean A. McManus. Northwest Science, 38 (3):65-82, August 1964. Distributions of Dissolved Oxygen, Density, and Nutrients off the Washington and Oregon Coasts; by Unnsteinn Stefansson and Francis A. Richards. Deep-Sea Research, 11 (3):355-380, July 1964. Observations of Wildlife off the Coast of Washington and Oregon in 1963, with notes on the Laysan Albatross (Diomedea immutabilis) in this Area; by Gerald A. Sanger. The Murrelet, 46 (1):1-6, 1965. A Large-diameter Coring Device; by Dean A. McManus. Deep-Sea Research, 12 (2):227-232, April 1965.

AD-640 413 **Field 8A, 8C, 8G**
Not available from CFSTI.
Washington Univ., Seattle. Dept. of Oceanography.
A COMPILATION OF ARTICLES REPORTING RESEARCH.
Technical repts.
Jan 66, 138p WU-Ref-M66-1, TR-136-141
Contracts Nonr-477 (10), Nonr-477 (37)
Proj. NR-083-012
Availability: Published in various journals noted below.

Descriptors: (*Oceanology, Scientific research), Plankton, Marine biology, Water waves, Rock (Geology), Manganese, Minerals, Ocean bottom, Marine geology.

Contents: Vertical Distribution of Zooplankton in the Sea; by K. Banse. Pp. 55-125 in Progress in Oceanography, vol. II (Mary Sears, ed.). Pergamon Press, London. 1964. Synonyms of Protodorvillea Egena (Ehlers) (Eunicidae, Polychaeta); by K. Banse and G. Hartmann-Schroder. Proceedings of the Biological Society of Washington, 77:241-242. 30 Dec 1964. Influence of Variable Depth on Steady Zonal Barotropic Flow; by Gene H. Porter and Maurice Rattray, Jr. Deutsche Hydrographische Zeitschrift, 17 (4):164-174. 1964. Mesopelagic Caridean Shrimp Notostomus Japonicus Bate in the Northeastern Pacific; by Belle A. Stevens and Fenner A. Chace, Jr. Crustaceana, 8 (pt. 3):277-284. 1965. Carboniferous Glacial Rocks from the Werrie Basin, New South Wales, Australia; by John T. Whetten. Geological Society of America Bulletin, 76:43-56. January 1965. Origin of Manganese Nodules on the Ocean Floor; by Enrico Bonatti and Y. Rammohanroy Nayudu. American Journal of Science, 263:17-39. January 1965.

AD-640 414 **Field 8A, 8G, 8C**
Not available from CFSTI.
Washington Univ., Seattle. Dept. of Oceanography.
A COMPILATION OF ARTICLES REPORTING RESEARCH.
Technical rept.
Sep 65, 111p WU-Ref-M65-35, TR-120-126
Contracts Nonr-477 (10), Nonr-477 (37)
Proj. NR-083-012
Availability: Published in various journals noted below.

Descriptors: (*Oceanology, Scientific research), Alaska Gulf, Marine geology, Water waves, Plankton, Decomposition, Sedimentation, Pacific Ocean.

Contents: Volcanic Ash Deposits in the Gulf of Alaska and Problems of Correlation of Deep-Sea Ash Deposits; by Y. Rammohanroy Nayudu. Marine Geology, 1 (3):194-212, May 1964. Variations in the O18/O16 and C13/C12 Ratios of Diagenetically Altered Limestones in the Bermuda Islands; by M. Grant Gross. Journal of Geology, 72 (2):170-194, March 1964. Time-dependent Motion in an Ocean: A Unified Two-layer, Beta-Plane Approximation; by Maurice Rattray, Jr. Pp. 19-29 in Studies on Oceanography (Kozo Yoshida, ed.). Ocean Research Institute, University of Tokyo. 1964. Nutrient Regeneration From Phytoplankton Decomposing in Seawater; by Edwin V. Grill and Francis A. Richards. Journal of Marine Research, 22 (1):51-69, January 1964. Carbonate Deposits and Paleoclimatic Implications in the Northeast Pacific Ocean; by Y. R. Nayudu. Science, 146 (3643):515-517, October 1964. A Theoretical Model for Estimating the Abundance of Planktonic Fish Eggs; by T. Saunders English. Rapports et Proces Verbaux, 155 (31):174-182, 1964. Recent Marine Sediments in Saanich Inlet, a Stagnant Marine Basin; by Sevket M. Gucluer and M. Grant Gross. Limnology and Oceanography, 9 (3):359-376, July 1964.

AD-640 415 **Field 8A, 8G**
Not available from CFSTI.
Washington Univ., Seattle. Dept. of Oceanography.
A COMPILATION OF ARTICLES REPORTING RESEARCH.
Technical repts.
Feb 66, 75p WU-Ref-M66-4, TR-150-155
Contracts Nonr-477 (10), Nonr-477 (37)
Proj. NR-083-012
Availability: Published in various journals noted below.

Descriptors: (*Oceanology, Scientific research), Marine biology, Marine geology, Foraminifera, Petrology, Rock (Geology), Paleontology.

Contents: A New Morphologic Variation of the Foraminifer Cibicides Lobatulus; by Susan C. Cooper. Contributions from the Cushman Foundation for Foraminiferal Research, 16 (pt. 4):137-140. 1965. A Redescription of the Euphausiid Crustacean, Nematoscelis Difficilis Hansen; 1911, by Patsy A. McLaughlin. Crustaceana, 9 (pt. 1):41-44. 1965. Chemical Observations in Some Anoxic, Sulfide-bearing Basins and Fjords; by Francis A. Richards. Pp. 215-243 in Proceedings, Second International Water Pollution Research Conference, Tokyo 1964. Pergamon Press, New York. 1965. Petrology of Submarine Volcanics and Sediments in the Vicinity of the Mendocino Fracture Zone; by Y. Rammohanroy Nayudu. Pp. 207-220 in Progress in Oceanography, vol. 3 (Mary Sears, ed.). Pergamon Press, London. 1965. Wairakite from Low-grade Metamorphic Rocks on St. Croix, U.S. Virgin Islands; by John T. Whetten. The American Mineralogist, 50:752-755. May-June 1965. Palynological Study on Plant Microfossils from the Shihti Formation, Miocene 'Middle Coal-bearing Bed,' TAIWAN; by Hsin-Yi Ling. Proceedings, Geological Society of China, no. 8, pp. 19-23, April 1965.

AD-640 416 **Field 8A, 8G**
Not available from CFSTI.
Washington Univ., Seattle. Dept. of Oceanography.
A COMPILATION OF ARTICLES REPORTING RESEARCH.
Technical repts.
Jan 66, 94p WU-Ref-M66-2, TR-142-149
Contracts Nonr-477 (10), Nonr-477 (37)
Proj. NR-083-012
Partially sponsored by AEC Contract AT (45-1)-1725.
Availability: Published in various journals noted below.

Descriptors: (*Oceanology, Scientific research), Marine biology, Pacific Ocean, Sedimentation, Plankton, Chlorophylls, Salinity, Radioactivity, Rivers.

Contents: Bio-lithology of Northeast Pacific Surface Sediments; by Y. R. Nayudu and B. J. Enbysk. Marine Geology, 2 (4):310-342. 1964. The Tintinnid Parafavella Gigantea (Brandt), Kofoid and Campbell, 1929, in the North Pacific Ocean; by Hsin-Yi Ling. Journal of Paleontology, 39 (4):721-723. 1965. The Carbonate Content of Surface Sediments from the Northeast Pacific Ocean, by M. Grant Gross. Northwest Science, 39 (3):85-92. 1965. Radioactivity of the Columbia River Ef-

fluent; by M. Grant Gross, Clifford A. Barnes, and Gordon K. Riel. Science, 149 (3688):1088-1090. 1965. Fractionation of Phytoplankton Communities off the Washington and Oregon Coasts; by George C. Anderson. Limnology and Oceanography, 10 (3):477-480. 1965. Chlorophylls in Marine Phytoplankton: Correlation with Carbon Uptake; by G. C. Anderson and K. Banse. Deep-Sea Research, 12 (4):531-533. 1965. Graphic Representation of the Salinity Distribution Near the Columbia River Mouth; by Betty-Ann Morse and Noel McGary. Pp. 923-942 in Ocean Science and Ocean Engineering 1965, vol. 2. Marine Technology Society, Washington, D. C. 1965. The Union of the Columbia River and the Pacific Ocean -- General Features; by Alyn C. Duxbury. Pp. 914-922 in Ocean Science and Ocean Engineering 1965, vol. 2. Marine Technology Society, Washington D. C. 1965.

AD-477 715 See Field 8C

AD-640 348 See Field 6T

AD-640 402 See Field 11F

AD-640 463 See Field 5B

PB-170 958 See Field 8J

8B. CARTOGRAPHY

AD-479 765 **Field 8B**
CFSTI Prices: HC$4.00 MF$0.75
Navy Electronics Lab., San Diego, Calif.
SINGLE-DEPTH CHARTS OF THE WORLD'S OCEAN BASINS AT DEPTHS TO 3500 FATHOMS. SET 1.
Research and development rept., Nov 63-Nov 64, by E. R. Anderson. 10 Dec 64, 107p NEL-1252-Set-1
SR-004-03-01
Task 0586

Descriptors: (*Oceanographic data, Maps), Depth finding, Ocean bottom topography, Arctic Ocean, Atlantic Ocean, Indian Ocean, Pacific Ocean, Mediterranean Sea, Ocean bottom.

It has been common practice in marine topography to represent depth by means of graded contour lines. To accentuate change in ocean shape as a function of depth, the report portrays the world's ocean basins in a series of regional single-depth charts at 500-fathom intervals from 500 to 3500 fathoms. Land masses at or above sea level are shown solid black. Ocean bottom above chart depth is shaded. Water deeper than chart depth is shown white. Three sets of charts are available. Set 1 comprises the series of regional single-depth charts, a locator, and a series of composite world charts, all 8 by 10 1/2 inches. Set 2 contains a locator and the regional maps in 17-by-22-inch size for use in plotting, plus the world charts in 22-by-34-inch size for wall mounting. The charts were prepared from U. S. Navy hydrographic office chart H. O. misc. 15,254, titled 'The World.' (Author)

AD-640 234 See Field 5G

8C. DYNAMIC OCEANOGRAPHY

AD-467 695 **Field 8C, 12A**
CFSTI Prices: HC$2.00 MF$0.50
New York Univ., N. Y. Dept. of Meteorology and Oceanography.
A STUDY OF OCEAN WAVE AMPLITUDES IN TERMS OF THE THEORY OF RUNS AND A MARKOV CHAIN PROCESS.
Technical rept.,
by M. D. Sawhney. Jan 62, 32p
Contract NObs-72018

Descriptors: (*Ocean waves, Hydrodynamic configurations), Mathematical models, Cyclic rate, Theory, Statistical analysis, Probability, Pressure, Tables, Statiscal processes.

The dependency of the successive amplitudes of pressure records of ocean waves is studied by means of the theory of runs, and the theory of a markov chain process. The runs test indicates that the dependency of the amplitudes is lost at the third half cycle for most of the records studied. The markov chain process shows that the dependency of the amplitudes is weak after three half cycles and is lost completely after eight half cycles for the records studied. (Author)

AD-477 715 **Field 8C, 8A, 8J, 8K K**
CFSTI Prices: HC$6.00 MF$1.50
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
US-IGY DRIFTING STATION ALPHA ARCTIC OCEAN 1957-1958.
Special reports,
by G. H. Cabaniss, K. L. Hunkins, and N. Untersteiner. Nov 65, 300p AFCRL-SR-38, AFCRL-65-848
Proj. AF-8623
Task 862303

Descriptors: (*Arctic Ocean, Air Force research), (*Ice islands, Oceanology), Arctic regions, Reports, United States Government, Meteorology, Ice, Physics, Geophysics, Geology, Marine Biology, Plankton, Scientific research.

Identifiers: Alpha station, Ice skate project, Sea-air interaction.

Contents: The equilibrium drift of ice station alpha; The roughness parameters of sea ice; On the mass and heat budget of Arctic Sea ice; Heat balance at the surface of the Arctic Ocean; Remarks on the cooling power in polar regions; Seismic studies of sea ice; Pack-ice studies in the Arctic Ocean; The deuterium content in Arctic Sea ice; Waves on the Arctic Ocean; Seismic studies of the Arctic Ocean floor; Some features of Arctic deep-sea sedimentation; dredged gravels from the central Arctic Ocean; Biological and Geological observations on the first photographs of the Arctic Ocean deep-sea floor; Some biological oceanographic observations in the central North Polar Sea, drift station alpha, 1957-1958; Some remarks on Arctic Ocean plankton, Arctic archibenthal and abyssal mollusks from drifting station alpha; Zooplankton collections from the high polar basin with special reference to the copepoda; Ice drift in the Arctic Ocean; Preliminary results of thermal budget studies on arctic pack ice during summer and autumn; The trachymedusa, botrynema ellinorae, an indicator plankton of arctic water; Primary production in the central north polar sea; Drifting station alpha, 1957-1958; The ice floes of station alpha.

AD-467 864 See Field 12A

AD-639 722 See Field 8A

AD-640 413 See Field 8A

AD-640 414 See Field 8A

AD-640 463 See Field 5B

8D. GEOCHEMISTRY

N66-29386 **Field 8D**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
LAWS GOVERNING THE OCCURRENCE OF RARE EARTH ELEMENTS.
Zakonomernosti Raspredeleniya Redkozemel'-nykh Elementov V Zemnoy Kore
by YU. A.Balashov. Jul 63, 23p NASA-TT-F-8467
Transl. Into English From Geokhimiya (Moscow), No. 2, 1963 P 99- 114

Descriptors: *Geology, *Petrology, *Rare earth, Analysis, Cerium, Chondrite, Correlation, Crust, Earth, Group, Iron, Magnesium, Mantle, Rare, Ratio, Rock, Silicate, Yttrium.

For abstract, see S 04 16.

N66-29444 **Field 8**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
THE METHOD OF INVESTIGATING METEORITES AND TEKTITES WITH THE AID OF INFRARED SPECTROMETRY.
Metod Issledovaniya Meteoritov I Tektitov S Pomoshch'yu Infrakrasnoy Spektrometrii
by A. A. Kadushin, and G. G. Vorobyev. Nov 65, 10p NASA-TT-F-8711
Transl. Into English From Meteoritika (Ussr), V 22, 1962 P 104- 109

Descriptors: *Infrared spectrometer, *Meteoritic composition, *Tektite, Absorption, Amorphous, Composition, Compound, Design, Differential, Emission, Energy, Frequency, Infrared, Meteorite, Mineral, Operation, Organic, Radiation, Spectrometer, Spectrum, Structural, Thermal, X-ray.

For abstract, see S 04 16.

N66-29722 **Field 8**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
CLASSIFICATION OF IRON METEORITES BY STRUCTURE.
O Klassifikatsii Zheleznykh Meteoritov Po Strukture
by A. A. Yavnel. May 66, 18p NASA-TT-F-10130
Transl. Into English From Meteoritika (Moscow) No. 26, 1965 P 140-145

Descriptors: *Crystal structure, *Iron meteorite, *Meteoritic composition, Chemistry, Classification, Composition, Crystal, Granule, Iron, Meteorite, Mineralogy, Nickel, Structure.

For abstract, see S 04 16.

8E. GEODESY

AD-640 380 **Field 8**
CFSTI Prices: HC$1.60 MF$0.50
Aeronautical Chart and Information Center, St. Louis, Mo. Linguistic Section.
STUDY OF THE SOLUTION OF STOKES' PROBLEM WITH THE PROPORTIONAL ERROR OF THE ORDER OF THE SQUARE OF THE EARTH'S FLATTENING,
by M. S. Molodenskii. Aug 66, 17p ACIC-TC-1103
TT-66-62454
Issledovanie Resheniya Zadachi Stoksa s Otnositelnoi Pogreshnostyu Poryadka Kvadrata Szhatiya Zemli, trans. of Tsentralnyi Nauchno-Issledovatelskii Institut Geodezii, Aerosemki i Kartografii Trudy (USSR) v112 p13-21 1956.

Descriptors: (*Potential theory, Earth (Planet)), (*Earth (Planet), Configuration), Geodesics, USSR.

N66-29509 **Field 8**
CFSTI Prices HC$1.00 MF$0.50
Bellcomm, Inc., Washington, D. C.
RELATIONSHIPS BETWEEN GEOGRAPHIC AND INERTIAL COORDINATES OF POSITION.
by W. G. Heffron, and S. B. Watson. 17 Mar 66, 20p NASA-CR-75926, TM-66-2012-1
Contract NASW-417

Descriptors: *Geocentric coordinate, *Geodetic position, *Inertial coordinate system

Altitude, Angle, Computation, Conversion, Coordinate, Declination, Error, Geodesy, Geography, Inertial, Latitude, Longitude, Position, System, Vehicle.

For abstract, see S 04 16.

N66-29743 **Field 8E**
CFSTI Prices HC$6.00 MF$1.25
Ohio State Univ. Research Foundation, Columbus.
THE DETERMINATION AND DISTRIBUTION OF PRECISE TIME.
by H. D. Preuss. Apr 66, 221p NASA-CR-76007
Contract NSR-36-008-033
Its Rept.-70

Descriptors: *Atomic clock, *Time measurement, *Timing apparatus, Apparatus, Atom, Cesium, Clock, Constant, Distribution, Frequency, Isotope, Measurement, Radio, Signal, Time, Timing, Transmission.

For abstract, see S 04 16.

PB-170 904 **Field 8E**
CFSTI Prices: HC$4.00 MF$0.75
Smithsonian Astrophysical Observatory, Cambridge, Mass.
GEOMETRIC STRUCTURE OF THE EARTH'S GRAVITATIONAL FIELD AS DERIVED FROM ARTIFICIAL SATELLITES.
Special rept. on Research in Space Science,
by W. Kohnlein. 28 Jan 66, 110p SAO-SR-198
Grant NsG-87-60

Descriptors: (*Gravity, Geometry), Earth (Planet), Space environmental conditions, Tables, Maps, Trajectories.

The structure of the Earth's gravitational potential and its gradient was studied at sea level and in outer space (1,000 km, 10,000 km, and 100,000 km elevation above sea level), with particular consideration given to the surfaces of constant potential and of constant gravitation. Their shape, curvature, etc., are computed and the results presented in tables and maps using the zonal part of the gravitational field as a reference frame. In a concluding section the geometry of the orthogonal trajectories of the equipotential surfaces (direction of the gradient field) is briefly touched. Among others, the curvature and torsion of the verticals are derived and the trajectories are integrated up to 10 km height for the gravity field and 100,000 km for the gravitational field. All numerical computations are based on Izsak's and Kozai's latest harmonic coefficients of the gravitational potential. (Author)

AD-640 238 **See Field 22C**

AD-640 321 **See Field 9B**

AD-640 322 **See Field 9B**

AD-640 326 **See Field 22A**

8F. GEOGRAPHY

AD-639 695 **Field 8F**
CFSTI Prices: HC$2.00 MF$0.50
American Univ., Washington, D. C. Center for Research in Social Systems.
INTRODUCTORY GUIDE TO LATIN AMERICAN STUDIES. A BIBLIOGRAPHIC ESSAY,
by Hartley F. Dame, and Joseph M. Macrum. Jul 66, 33p
Contract DA-49-092-ARO-7

Descriptors: (*Latin America, Social sciences), History, Economics, Political science, Education, Religion, Culture, Bibliographies.

Designed to assist beginning students of Latin America, this essay discusses works considered by the authors to be most useful in imparting general introductory knowledge. Works selected are limited to those published in the English language by authors whose reputations insure wide distribution and availability of their works. Hispanic America, Lusitanic America, and Middle America and the Caribbean are discussed separately. In addition to the works discussed in the essay, a supplemental bibliography on politics in Hispanic America is provided. (Author)

N66-27960 **Field 8F**
CFSTI Prices HC$1.00 MF$0.50
Northwestern Univ., Evanston, Ill. Dept. Of Geography.
SOME COMMENTS ON CERTAIN TECHNICAL ASPECTS ON GEOGRAPHIC INFORMATION SYSTEMS TECHNICAL REPORT NO. 2.
by M. F. Dacey, and D. F. Marble. Dec 65, 16p
NASA-CR-75576
Contract NONR-1228/35/
Sponsored By Nasa

Descriptors: *Geography, *Information processing, *Machine language, *Mathematical statistics, Cartography, Design, Dimension, Distribution, Information, Language, Machine, Mapping, Mathematics, Pattern, Photography, Probability, Processing, Recognition, Space, Spatial, Statistics, Symbol, System, Two.

For abstract, see S 04 15.

N66-29235 **Field 8F**
CFSTI Prices HC$2.60 MF$0.50
Northwestern Univ., Evanston, Ill. Dept. Of Geography.
MEASURES OF DISTANCE FROM A RANDOMLY LOCATED POINT TO NEIGHBORING LATTICE POINTS FOR RECTANGULAR AND HEXAGONAL POINT LATTICES TECHNICAL REPORT NO. 3.
by M. F. Dacey. Dec 65, 25p NASA-CR-75948, AD-631751
Contract NONR-1228/35/
Sponsored In Part By Nasa

Descriptors: *Distribution function, *Lattice point, *Probability density, Analysis, Densi-

tion, Function, Geography, Lattice, Mapping, Measurement, Numerical, Order, Point, Polygon, Probability, Rectangle, Square, Statistics.

For abstract, see S 04 16.

AD-640 234 **See Field 5G**

AD-640 482 **See Field 6G**

8G. GEOLOGY AND MINERALOGY

AD-639 679 **Field 8G, 8K**
CFSTI Prices: HC$5.00 MF$1.00
Alberta Univ., Edmonton. Dept. of Physics.
CRUSTAL STRUCTURE IN WESTERN CANADA.
Final rept., 1 May 63-30 Apr 66,
by G. L. Cumming, and E. R. Kanasewich. 30 Jun 66, 194p
Contract AF 19 (628)-2835, ARPA Order-292
Proj. AF-8652
Task 865202
AFCRL-66-519
See also AD-611 129.

Descriptors: (*Structural geology, *Canada), (*Seismology, Canada), Underground explosions, Seismic waves, Propagation, Velocity, Seismographs, Stratigraphy, Mapping, Geophysics.

Identifiers: Vela-Uniform project.

The report deals with crustal seismic refraction and reflection measurements in Western Canada. Evidence is presented to support three major layers in the crust below the sediments, with velocities of 6.1, 6.5 and 7.2 kilometers per second, overlying the upper mantle with velocity close to 8.2 kilometers per second. The total crustal thickness is about 45 kilometers. Refraction measurements indicate substantial lateral velocity variations in the crust, and these are related to large variations in the gravity field. Preliminary data suggest the presence of a low velocity layer in the upper mantle at a depth of about 120 kilometers. Reflection measurements indicate that a strong reflecting horizon is present at a depth close to the top of the 7.2 kilometer per second layer, and this reflector appears to be continuous over distances of several tens of kilometers. (Author)

AD-639 790 **Field 8G, 17I**
Not available from CFSTI.
Kansas Univ., Lawrence. Center for Research.
THE GEOLOGICAL VALUE OF SIMULTANEOUSLY PRODUCED LIKE-AND-CROSS-POLARIZED IMAGERY,
by L. Dellwig, and R. K. Moore. 20 Jan 66, 5p
CRES-61-13
Contract NsR-17-004-003
Availability: Published in Journal of Geophysical Research v71 n14 p3597-3601 15 Jul 1966.

Descriptors: (*Side-looking radar, Photogeology), (*Radar images, *Photogeology), Polarization, Geology.

In simultaneously produced like- and cross-polarized imagery, as exemplified by the Pisgah Crater area, the geologist finds information previously unattainable from only like-polarized radar imagery. Preliminary examination of this imagery suggests the possibility of differentiation of source of alluvial material, differentiation of rock types in areas of apparent similarity, and the absolute identification of rock type on the basis of contrast in return from various combinations of polarized radar. (Author)

AD-639 893 **Field 8G, 3A**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
THE ORIGIN OF CONTINENTS.
Environmental research papers,
by J. W. Salisbury, and L. B. Ronca. Jul 66, 8p
AFCRL-ERP-212, AFCRL-66-510
Proj. AF-8602
Task 860203
Availability: Published in Nature v210 n5037 p669-70 14 May 1966.

Descriptors: (*Structural geology, *Meteorites), Asteroids, Impact prediction, Earth (Planet).

Identifiers: Continent formation.

Theories advanced to explain the origin of continental nuclei have generally failed to explain the first step in continent formation. The authors propose that the localized additions of energy to the earth's crust, which would result from the impact of large meteoroids, could produce continental nuclei. (Author)

AD-640 320 **Field 8G, 8K**
CFSTI Prices: HC$1.00 MF$0.50
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
BIBLIOGRAPHY OF EXPERIMENTAL ROCK DEFORMATION, SECOND EDITION, PART II.
Special repts.,
by R. E. Riecker. Aug 66, 15p AFCRL-SP-35-Pt-2, AFCRL-65-740-Pt-2
Proj. AF-7639
Task 763905
See also AD-627 002.

Descriptors: (*Engineering geology, Bibliographies), (*Rock (Geology), Deformation), (*Seismology, Bibliographies), Geophysics, Minerals, Petrology.

This first supplement to the 'Bibliography of Experimental Rock Deformation, Second Edition,' (AD-627 002) AFCRL-65-740, October 1965, lists 111 cross-referenced research articles taken from scientific journals and books. The listings include the following 29 categories: Apparatus, Brittle Behavior, Calcite, Calibration, Conductivity, Creep, Dislocations, Fabric, Friction, General, Ice, Marble, Olivine, Phase Studies, Quartz, Recrystallization, Resistance, Sedimentary Rocks, Seismic Velocities, Shear, Shock, Strain Rate, Surveys, Viscosity, and X-ray. (Author)

AD-640 391 **Field 8G**
CFSTI Prices: HC$1.00 MF$0.50
Hydraulic Engineering Lab., Univ. of California, Berkeley.
A RECONNAISSANCE HEAVY MINERAL STUDY OF MONTEREY BAY BEACH SEDIMENT.
Technical rept.,
by Frederick L. Sayles. Aug 66, 22p HEL-2-16
Contract DA-49-055-CIVENG-63-4

Descriptors: (*Minerals, Beaches), Bays, Sedimentation.

Identifiers: Monterey Bay.

Conclusions: The compositional changes that occur along the beaches of Monterey are not the result of selective sorting processes but rather reflect changes in the source sediment. Such changes may result from several different supply-littoral transport conditions. The changes which may occur at river mouths may reflect a flooding out of littorally transported sediment; changes not related to rivers may reflect local supply from cliff erosion. In the absence of any significant supply of sediment from rivers and cliff erosion these changes must reflect a lack of littoral transport and prior conditions which produced the observed mineralogical pattern. Only in areas devoid of long-term net littoral transport can such relict sedimentary dispersal patterns be preserved.

AD-640 498 **Field 8G**
CFSTI Prices: HC$3.00 MF$0.75
Brown Univ., Providence, R. I. Dept. of Geological Sciences.
STUDIES OF EXTRATERRESTRIAL PARTICLES IN SEDIMENTARY ROCKS.
Final rept. May 63-Sep 66,
by Thomas A. Mutch. Sep 66, 83p
Contract AF 19 (628)-2841
Proj. AF-8602
Task 860203
AFCRL-66-628

Descriptors: (*Sedimentary rock, Meteorites), (*Meteorites, Chemical analysis), Rock salt, Magnetite, Geologic age determination, Stratigraphy, Sedimentation, Material separation.

Identifiers: Permian, Silurian.

A number of sedimentary rocks, chiefly rock salts, have been processed for the recovery of possible extraterrestrial particles. The only recognizable particles in this category are opaque magnetic spherules composed chiefly of magnetite. The mode of occurrence of the spherules suggests an extraterrestrial origin, though neither the chemistry or minerology of individual particles is uniquely meteoritic. Influx rates calculated for spherules contained in Silurian and Permian salts are closely similar to those calculated by Crozier (Nine years of Continuous Collection of Black Magnetic Spherules from the Atmosphere: J. Geo phys. Res. 71, 603-611) for the recent geologic age. This suggests a general constancy of meteoritic activity throughout this period of geologic time. (Author)

N66-27491 **Field 8G**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
SHOCK COMPRESSION OF PERICLASE AND QUARTZ AND THE COMPOSITION OF THE ABYSSAL MANTLE OF THE EARTH.
Udarnoye Szhatiye Periklaza I Kvartsa I Sostav Nizhney Mantii Zemli
by L. V. Altshuler, G. V. Simakov, and R. F. Trunin. Apr 66, 16p NASA-TT-F-10101
Transl. Into English From Izv. Akad. Nauk Sssr, Fiz. Zemli (Moscow), No. 10, 1965 P 1-6

Descriptors: *Compressibility effect, *Earth mantle, *Quartz, Adiabat, Composition, Compressibility, Curve, Deep, Earth, Effect, High pressure, Mantle, Periclase, Physics, Rock, Shock.

For abstract, see S 04 15.

N66-28832 **Field 8G**
CFSTI Prices HC$1.00 MF$0.50
General Dynamics Corp., San Diego, Calif. John Jay Hopkins Lab. For Pure And Applied
RESEARCH ON ELEMENTAL ABUNDANCES IN METEORITIC AND TERRESTRIAL MATTER SUMMARY PROGRESS REPORT, 1 SEP. 1964 - 31 AUG. 1965.
by R. A. Schmitt. 31 Aug 65, 20p NASA-CR-75812, GA-6642
Contract NASW-843

Descriptors: *Chondrite, *Element abundance, *Instrumental analysis, *Meteorite, *Neutron activation, Abundance, Activation, Analysis, Carbonaceous, Chondrule, Chromium, Cobalt, Copper, Element, Instrument, Iron, Manganese, Neutron, Radionuclide, Scandium, Silicon, Sodium, Spectrometer.

For abstract, see S 04 16.

N66-29729 **Field 8G**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
PRELIMINARY INVESTIGATION OF THE MINERALOGICAL COMPOSITION OF THE STONE METEORITE VENEROVA.
Predvaritel'noye Issledovaniye Mineralogicheskogo Sostava Kamennogo Meteorita Vengerovo
by I. A. Yudin. Jun 66, 12p NASA-TT-F-10213
Transl. Into English From Dokl. Akad. Nauk Ssr (Moscow), V. 84, No. 1, 1952 P 123-126

Descriptors: *Meteoritic composition, *Mineralogy, *Stony meteorite, Analysis, Chemical, Composition, Etching, Meteorite, Microscopy, Ore, Silicate, Spectral, Stone.

For abstract, see S 04 16.

N66-35662 **Field 8G**
CFSTI Prices HC$2.50 MF$1.75
Geological Survey, Flagstaff, Ariz.
INVESTIGATION OF IN SITU PHYSICAL PROPERTIES OF SURFACE AND SUBSURFACE SITE MATERIALS BY ENGINEERING GEOPHYSICAL TECHNIQUES ANNUAL REPORT.
by R. H. Godson, R. A. Loney, and J. S. Watkins. 1964, 90p NASA-CR-65488
NASA ORDER T-25091

Descriptors: *Energy spectrum, *Geology, *Lunar surface, *Seismic energy, Attenuation, Detection, Energy, Formation, Frequency, Geophysics, Instrument, Lunar, Property, Seismic, Spectrum, Subsurface, Surface, Test.

For abstract, see S 04 21.

N66-35875 **Field 8G, 21F**
CFSTI Prices HC$3.00 MF$0.75
Westinghouse Electric Corp., Pittsburgh, Pa. Astronuclear Lab.
PROPERTIES OF P-03 GRAPHITE.
by V. Kachur. 12 Jan 65, 82p NASA-CR-77891, WANL-TME-1031
Contract SNP-1

Descriptors: *Graphite, *Hardware, *Nuclear engine for rocket vehicle (nerva), Coefficient, Density, Electric, Energy, Expansion, Mechanical, Microstructure, Nuclear, Property, Reactor, Resistivity, Rocket, Thermal, Vehicle.

For abstract, see S 04 21.

N66-35952 **Field 8G**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
MINERALOGICAL-STRUCTURAL FEATURES OF THE SEVRYUK STONY METEORITE.
by I. A. Yudin. May 66, 22p NASA-TT-F-10126
Transl. Into English From Meteritika (Moscow), No. 14, 1956 P 101-109

Descriptors: *Microstructure, *Mineralogy, *Stony meteorite, Analysis, Chondrule, Iron, Metamorphism, Meteorite, Nickel, Stone, Structural, Thermal, Troilite.

For abstract, see S 04 21.

N66-35953 **Field 8G**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
OPAQUE MINERALS OF STONY METEORITES.
Neprozrachnyye Mineraly Kamennykh Meteoritov
by I. A. Yudin. May 66, 44p NASA-TT-F-10127
Transl. Into English From Meteoritika (Moscow), No. 16, 1958 P 78-104

Descriptors: *Mineral, *Stony meteorite, Chemical, Chondrite, Composition, Copper, Distribution, Grain, Iron, Meteorite, Nickel, Opaque, Stone.

For abstract, see S 04 21.

N66-35966 **Field 8G**
CFSTI Prices HC$3.25 MF$1.25
Geological Survey, Flagstaff, Ariz.
INVESTIGATION OF IN SITU PHYSICAL PROPERTIES OF SURFACE AND SUBSURFACE SITE MATERIALS BY ENGINEERING GEOPHYSICAL TECHNIQUES ANNUAL REPORT, FISCAL YEAR 1965.
by J. C. L. De bremaecker, R. H. Godson, R. A. Loney, J. S. Watkins, and J. H. Whitcomb. 1965, 185p NASA-CR-65489
NASA ORDER T-25091/G/

Descriptors: *Geophysics, *Lunar geology, *Seismology, *Shear disturbance, *Wave detection, Amplitude, Attenuation, Cavity, Detection, Disturbance, Engineering, Field, Formation, Geology, Lunar, Rock, Shear, Surface, Velocity, Volcanics, Wave.

For abstract, see S 04 21.

PB-170 927 **Field 8G**
CFSTI Prices: HC$2.60 MF$0.50
Commissariat a l'Energie Atomique, Fontenay-aux-Roses (France). Centre d'Etudes Nucleaires.
LES FORMATIONS A ANALCIME DE LA REGION D'AGADES (REPUBLIQUE DU NIGER) (Analcite Formation in the Agades Region (Niger)).
Jun 66, 29p CEA-R-2999
Availability: Original document in color until exhausted. Text in French; Summary in English.

Descriptors: (*Igneous rock, Africa), Sedimentary rock, France.

Identifiers: Analcime, Niger.

A study based mainly upon field mapping and drill cores examination, followed by a laboratory sur-

vey, allows to foreward a genetic hypothesis upon the formation of analcite in the 'Continental intercalaire' of Agades (Niger). Analcite could be generated from an early diagenesis of argillaceous sediments influenced by high soda content connate waters inside confined continental sedimentary basins. (Author)

PB-172 451 Field 8G, 13C
CFSTI Prices: HC$3.00 MF$0.75
South Dakota State Geological Survey, Vermillion.
EVALUATION OF EXPLORATION METHODS FOR COARSE AGGREGATE IN EASTERN SOUTH DAKOTA,
by Richard L. Bruce, and Beverly E. Lundberg.
1964, 94p Rept. no. 95
Prepared in cooperation with South Dakota State Dept. of Highways, and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Geological survey, *South Dakota), Maps, Soils, Materials, Construction, Sand, Gravel, Aerial photographs, Photointerpretation.

Identifiers: Aggregates (Materials).

The coarse aggregate research project was initiated to assist the South Dakota Department of Highways in the organization of an aggregate inventory. Aggregate in the glaciated portion of South Dakota is found in recognizable landforms. These landforms may be in the form of outwash, lake beds, kames, kame terraces, eskers, and collapse features. Minor sources of aggregate may be found in some local bedrock sources. Potential aggregate sources may be outlined on geologic, pedologic and topographic maps and a materials location map may be compiled from these maps. Air photos can then be used to make detailed studies of potential areas shown on this materials location map. When the potential sources have been detailed, geophysical methods are used to determine the areal extent and depth of the deposit. A well integrated background in the geological sciences and physics is a prerequisite for any materials investigation. This study showed that by use of these exploration 'tools' up to 90 percent of the field work associated with materials investigations can be eliminated. The use of the resistivity method can eliminate a great majority of the drill holes usually needed to prove an aggregate deposit. (Author)

PB-172 452 Field 8G, 8M, 13B
CFSTI Prices: HC$3.00 MF$0.75
Rhode Island Univ., Kingston. Engineering Experiment Station.
ENGINEERING SOIL SURVEY OF RHODE ISLAND,
by Kendall Moultrop. Jul 65, 87p Bull-4
Prepared in cooperation with Rhode Island Dept. of Public Works and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Geological survey, *Rhode Island), (*Soils, Geological survey), Engineering geology, Climatology, Geology, Mapping, Maps, Soil mechanics, Geography, Drainage.

The report presents general information on the environmental aspects and the physical properties of the soils of Rhode Island. The method used in the preparation of the soil maps is explained with considerable detail. The meaning of map symbols and map units on these maps is clearly described. Chapter II, Climate, Physiography and Geology includes a few facts concerning climatic conditions, precipitation, temperatures, and topography in the State and a description of the bedrock and surficial geology. In Chapter III, Soils and Soil Testing, the origin of soil is discussed. Here, also, is given a description of the soil profile together with an outline of the soil tests necessary to determine the characteristics of the soils within the profile. In Chapter IV, Soil Mapping Technique, there is presented an outline of the procedure employed in the preparation of soil maps. This procedure describes the use of airphotos in the determination of soil boundaries. The map unit symbols which have been used on the map to indicate soil conditions are identified in Chapter V. Chapter VI describes the map units which have been used. For each map unit, information is presented on Formation, Soils, Drainage and Engineering Aspects. Appendix A, Summary of Soil Test Data, comprises test values for all samples. (Author)

AD-477 715 See Field 8C

AD-639 661 See Field 20F

AD-639 897 See Field 17E

AD-640 412 See Field 8A

AD-640 413 See Field 8A

AD-640 414 See Field 8A

AD-640 415 See Field 8A

AD-640 416 See Field 8A

CEX-61.7.2 See Field 18H

8H. HYDROLOGY AND LIMNOLOGY

PB-173 015 Field 8H, 4B
CFSTI Prices: HC$0.70 MF$0.75
Weather Bureau, Washington, D. C. Hydrometeorological Branch.
METEOROLOGICAL CONDITIONS FOR THE PROBABLE MAXIMUM FLOOD ON THE YUKON RIVER ABOVE RAMPART, ALASKA.
May 66, 104p Hydrometeorologica l-42
Hard copy also available from Superintendent of Documents, GPO, Washington, D. C., 20402 $0.70.

Descriptors: (*Meteorological parameters, *Floods), Alaska, Rivers, Wind, Storms, Snow.

Identifiers: Yukon Rivers.

The purpose of the report is to provide meteorological data needed to estimate the probable maximum flood from the Yukon River drainage basin above a proposed dam site at Rampart, Alaska.

PB-173 257 See Field 6F

8I. MINING ENGINEERING

PB-173 318 See Field 12A

PB-173 319 See Field 12A

PB-173 320 See Field 12A

PB-173 321 See Field 12A

PB-173 322 See Field 12A

8J. PHYSICAL OCEANOGRAPHY

AD-473 931 Field 8J, 7B, 18H
CFSTI Prices: HC$2.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
RUTHENIUM 106, ZIRCONIUM 95, AND POTASSIUM 40 AT SELECTED OCEAN STATIONS (1960-1965),
by G. K. Riel, R. A. Pedrick, D. H. Attaway, and J. J. Audet Jr. 30 Aug 65, 47p NOLTR-65-118

Descriptors: (*Radioactive isotopes, Sea water), Chemical analysis, Spectrum analyzers, Gamma rays, Atlantic Ocean, Northern Hemisphere, Pacific Ocean, Potassium, Ruthenium, Rhodium, Zirconium, Niobium, Salinity, Measurement, Nuclear explosions, Radioactive fallout, Distribution, Scattering, Radioactive waste, Oceans, Concentration (Chemistry).

The concentrations of potassium 40, ruthenium-rhodium 106, and zirconium-niobium 95 in the ocean have been measured by insitu gamma spectrometry at several Western North Atlantic and a few Eastern North Pacific sites between 1960 and 1965. The concentration of natural potassium 40 is proportional to salinity and close to reported average values. The zirconium-niobium 95 activity is due to fallout from nuclear weapons and decreased markedly after the test ban treaty. The ruthenium-rhodium 106 concentration reported is too high to be entirely due to nuclear tests, and shown no rational pattern with time or depth. (Author)

AD-480 397 Field 8J
CFSTI Prices: HC$6.60 MF$0.75
Bissett-Berman Corp., San Diego, Calif.
SALINITY, CONDUCTIVITY, AND TEMPERATURE RELATIONSHIPS OF SEAWATER OVER THE RANGE OF 0 TO 50 P.P.T.
Final rept.,
by Neil L. Brown, and Bjarne Allentoft. Mar 66, 67p
Contract Nonr-4290 (00)

Descriptors: (*Sea water, Physical properties), Salinity, Temperature, Conductivity, Equations of state, Instrumentation, Experimental data, Salinometers, Numerical analysis, Digital computers, Oceanology, Electrical conductance.

The report describes the relationship between conductivity, temperature, and salinity of sea water. The report describes the details of equipment used, the techniques, the numerical data obtained, and the results of numerical computer analysis on the data. This data does not cover absolute measurements of conductivity but only the relative changes with salinity and temperature.

AD-640 410 Field 8J
CFSTI Prices: HC$3.00 MF$0.50
Texas A and M Univ., College Station. Dept. of Oceanography.
OBJECTIVE DEFINITION OF THE THERMOCLINE,
by N. E. J. Boston. Aug 66, 52p Ref-66-19T
Contract Nonr-2119 (04)
Projs. NR-083-036, A/M-286-D

Descriptors: (*Bathythermograph data, Analysis), Data processing systems, Temperature.

Identifiers: Thermocline.

An objective method of analyzing bathythermograph data is discussed. A simple analysis of finite differences provides objective definition of the top, bottom and center of the thermocline. Secondary features such as transients, multiple thermoclines and inversions are examined in the light of this method and objectively analyzed with some success. A general program for the efficient handling of bathythermograph data is suggested and computer flow diagrams given. (Author)

AD-640 411 Field 8J
CFSTI Prices: HC$3.00 MF$0.75
Texas A and M Univ., College Station. Dept. of Oceanography.
ENVIRONMENTAL RESEARCH OFF PANAMA CITY, FLORIDA.
Final rept., May 61-Aug 66,
by R. D. Gaul. Aug 66, 75p Ref-66-21F
Contract Nonr-2119 (04)
Projs. NR-083-036, A/M-286-D

Descriptors: (*Oceanographic data, Mexico gulf), Oceanology, Data processing systems, Automation.

An air-sea environmental research program was initiated in May 1961 to use a pair of Navy owned

structures located in the Gulf of Mexico off Panama City, Florida. The purpose of this report is to encapsulate the five year operation and to summarize hydrographic data collected in 1966. One basic idea behind the environmental research program was exploitation of fixed station techniques to provide access to the real ocean for a wide range of air-sea phenomenological studies. Observational definition of the 'general' environment, facilitated by high volume automated data handling techniques, was to be the counterpart of experimental control in the laboratory. A unified experimental capability was undertaken wherein continuous multiple channel data acquisition, reduction, processing and analysis could be accomplished in support of both routine environmental monitoring and a multiplicity of individual studies, each with their own special measurement requirements. This capability was developed and used. (Author)

N66-27215 **Field 8J**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
ELECTRON MICROPROBE STUDY OF SPHERULES FROM ATLANTIC OCEAN SEDIMENTS.
by K. Keil, and R. A. Schmidt. 1965, 27p NASA-TM-X-56552
Submitted For Publication

Descriptors: *Atlantic ocean, *Electron beam, *Meteorite, *Sediment, Analysis, Beam, Cobalt, Dendrite, Electron, Magnetite, Microprobe, Nickel, Probe, Quantity, Spectrometer, Spherule.

For abstract, see S 04 15.

PB-170 905 **Field 8J**
CFSTI Prices: HC$13.60 MF$1.00
Lamont Geological Observatory, Palisades, N. Y.
PHYSICAL AND CHEMICAL OCEANOGRAPHIC OBSERVATIONS IN THE SOUTHERN OCEANS: USNS ELTANIN CRUISES 16-21 1965,
by Stanley S. Jacobs. May 66, 133p Technical rept. 1-CU-1-66
Grant NSF-GA-305

Descriptors: (*Oceanographic data, Tables), (*Bathythermograph data, Tables), (*Southern hemisphere, Oceanographic data), Sea water, Physical properties, Chemical properties, Oceanographic vessels, Temperature, Salinity, Oxygen, Nitrates, Phosphates, Silicates, Concentration (Chemistry), pH, Underwater sound.

Identifiers: Eltanin cruises.

The report includes hydrographic and chemical measurements at oceanographic stations occupied by the USNS ELATANIN on Cruises 16 through 21 (January, 1965 to January, 1966). A station map is included. There were 2465 bathythermograph observations made during these six cruises. Determination of BT reference temperatures, disposition of slides, etc., was described in PB-169 877.

PB-170 958 **Field 8J, 8A**
CFSTI Prices: HC$5.60 MF$0.75
Bureau of Commercial Fisheries, Seattle, Wash. Biological Lab.
OCEANOGRAPHIC OBSERVATIONS SOUTH OF ADAK ISLAND, SUMMER 1963,
by Craig Van Dyke. May 66, 59p Data report-12

Descriptors: (*Salinity, Pacific Ocean), (*Bathythermograph data, Pacific Ocean), (*Pacific Ocean, Data), Tables, Fishes, Alaska, Aleutian Islands.

Identifiers: Adak Island.

Temperature and salinity data to a depth of 1,050 m. were obtained at 44 stations between Adak Island and lat. 50 degrees N., from July 3 to September 11, 1963, aboard the RV George B. Kelez. Tabulations of observed and interpolated data, as well as values of sigma-T and dynamic height anomaly, are presented. (Author)

PB-170 959 **Field 8J**
CFSTI Prices: HC$17.80 MF$1.00
Woods Hole Oceanographic Institution, Mass.
OCEANOGRAPHIC OBSERVATIONS, 1963, EAST COAST OF THE UNITED STATES,
by Joseph Chase. Mar 66, 182p
Contracts Nonr-2196 (01), 14-17-007-104
Supported in part by contracts 14-17-0007-175 and 14-17-0007-253 from the Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, Washington, D. C. Data Report 10.

Descriptors: (*Atlantic Ocean, Data), (*Salinity, Atlantic Ocean), (*Bathythermograph data, Atlantic Ocean), Tables.

Daily water temperature and salinity observations for 1963 from 15 locations along the Atlantic seaboard are tabulated, plotted, and discussed. (Author)

PB-172 420 **Field 8J, 18H, 18C**
CFSTI Prices: HC$5.60
Naval Medical Research Inst., Bethesda, Md.
SEA WATER RADIOLOGICAL MONITORING METHODS.
Research rept.,
by J. W. Duckworth, F. W. Chambers Jr, W. H. Chapman, and H. E. Severance. 13 Mar 59, 55p
NAVMED-NM-62-04-00.04-01, AD-228 162
Vol-19, p119-72.

Descriptors: (*Sea water, *Radiological contamination), Radiation monitors, Underwater explosions, Nuclear explosions, Intensity.

The dispersal in time and sea of radioactive contamination produced by a deep underwater atomic blast was studied. Instrumentation methods obtained radiation intensity versus depth information for several surface locations, and continuously monitored a sea-water intake line aboard ship. Surface contamination measurements were also made. (Author)

AD-477 715 **See Field 8C**

AD-639 722 **See Field 8A**

AD-640 412 **See Field 8A**

AD-640 463 **See Field 5B**

8K. SEISMOLOGY

AD-473 363 **Field 8K**
CFSTI Prices: HC$5.00 MF$1.25
Michigan Univ., Ann Arbor. Inst. of Science and Tech.
DISPERSION TABLES FOR RAYLEIGH WAVES ON A SINGLE SURFACE LAYER,
by Harold M. Mooney, and Bruce A. Bolt. Oct 65, 199p 4410-102-X
Contract SD-78, Grant AF-AFOSR-62-411
VESIAC special report. Prepared in cooperation with Minnesota Univ., Minneapolis. Dept. of Geology and Geophysics, and California Univ., Berkeley. Dept. of Geology and Geophysics.

Descriptors: (*Seismic waves, Tables), Seismology, Scattering, Surface properties, Velocity, Determinants, Earth models, Compressive properties, Shear stresses, Density, Detection.

Tables are presented to show the dispersive characteristics for Rayleigh waves on a single elastic layer overlying a uniform elastic half-space. Two standard models are considered, each specified in terms of four parameters: Poisson's ratio in the layer and in the half-space, and the shear velocity and density ratios. Each parameter is varied through eight values, holding the other three parameters constant. For each such structure, results are given for the fundamental Rayleigh mode and the first and second shear modes. The tables consist of 32 cases, for each of three modes, for each of the two standard models, or a total of 192 tables. A special computation procedure for group velocities is used which eliminates the errors associated with the usual finite-difference approximation. Auxiliary information includes a tabulation of long-period cutoff values as a function of structure parameters. To illustrate the results for specific geologic and laboratory models, 36 additional tables are given. These include results for a continental ice cap, a continental crust, a sedimentary basin, an alluvial overburden, various two- and three-dimensional seismic models, and a case selected from the literature. (Author)

AD-639 743 **Field 8K**
CFSTI Prices: HC$5.00 MF$1.00
Pennsylvania State Univ., University Park. Dept. of Geology and Geophysics.
STUDIES OF THE EFFECT OF DEPTH OF FOCUS ON SEISMIC WAVES.
Special technical rept.,
by S. J. Gabriel Leblanc. 15 Jun 66, 156p SR-4
Contracts AF 19 (628)-238, ARPA Order 180-61
Proj. AF-8652
Task 865208
AFCRL-66-569
Report on Spectral Analysis of Short-Period First Arrivals of the April 13, 1963 Peruvian Earthquake.

Descriptors: (*Earthquakes, Seismographs), Seismic waves, Fourier analysis, Peru.

Identifiers: Vela-Uniform.

The short-period vertical seismograms of 37 stations for the Peruvian Earthquake of April 13, 1963 were Fourier-analyzed for a time duration of 10 plus or minus 0.5 sec. After proper instrumental corrections, the 37 frequency spectra were found to be quite similar in their overall shape, but very different in their finer structure. The similarity of the envelope appears to be most probably associated with the source while the crustal effect could account for the differences in the finer spectral structure. By using theoretical calculations based on the Thompson-Haskell matrix formulation, the crustal effect of any layered system on an incoming dilatational wave can be obtained. It was found that the distance affects mostly the level of the spectrum, and not its slope and character. The azimuthal effect manifests itself by a change in the slope of the spectral envelope and a shift of the cut-off frequency. The crustal effect appears to be so considerable that the other effects are impossible to measure accurately until the crustal effect has been removed by inverse-filtering. (Author)

AD-639 954 **Field 8K, 17J**
CFSTI Prices: HC$1.00 MF$0.50
Michigan Univ., Ann Arbor. Inst. of Science and Technology.
VESIAC MONTHLY BULLETIN OF VELA UNIFORM RESEARCH PUBLICATIONS.
15 Aug 66, 16p VESIAC Bull-43
See also AD-636 047.

Descriptors: (*Seismology, Bibliographies), Seismic waves, Nuclear explosions, Earthquakes, Structural geology, Seismographs.

Identifiers: Vela-Uniform.

AD-640 454 **Field 8K, 8I**
CFSTI Prices: HC$2.00 MF$0.50
Cold Regions Research and Engineering Lab. Hanover, N. H.
SEISMIC SURVEY NORTHWEST GREENLAND 1964.
Research rept.,

by Garry K. C. Clarke. Jul 66, 26p RR-191
Task 1V014501B52A02

Descriptors: (*Greenland, *Seismology), (*Glaciers, Seismology), Ice, Thickness, Seismic waves, Refraction, Temperature, Density, Velocity, Equations, Models (Simulations).

The thickness of the Greenland Ice Cap was determined by seismic sounding along the trail from Camp Tuto to Camp Century in Greenland and on traverses northwest and southwest from Camp Century. The average velocity of vertically traveling seismic waves at each shot location was estimated using the first-arrival data from reflection records and the 10-m temperature at each location. The results of three long refraction profiles and measurements of temperature, density, and seismic velocities at the Camp Century drill hole were used to check velocity estimates. An empirical formula from Robin satisfactorily related seismic wave velocities to the temperature and density of the firn and ice. A two-layer glacier model having a homogeneous ice layer overlain by a firn layer in which the P-wave velocity increased linearly with depth was used. (Author)

AD-477 715 **See Field 8C**

AD-639 661 **See Field 20F**

AD-639 679 **See Field 8G**

AD-639 904 **See Field 20L**

AD-640 212 **See Field 17J**

AD-640 320 **See Field 8G**

8L. SNOW, ICE, AND PERMAFROST

AD-639 872 **Field 8L, 7D**
Not available from CFSTI.
Westinghouse Research Labs., Pittsburgh, Pa.
MEASUREMENT OF BRINE DROPLET MIGRATION IN ICE.
Interim rept.,
by J. D. Harrison. 19 Aug 65, 7p
Contract AF 49 (638)-1029
Proj. AF-9761
Task 976102
AFOSR-66-1662
Availability: Published in Journal of Applied Physics v36 n12 p3811-5 Dec 1965.

Descriptors: (*Ice, *Salts), Separation, Drops, Motion, Liquids, Low-temperature research, Solutions.

Migration of NaCl, KF, and KI droplets through ice was measured in the temperature interval from -6 to 0C in the presence of a 15C/cm thermal gradient. Normally the droplets increased in velocity and size as they approached the ice-water interface. A 30-microns-diam droplet migrating at 0.3 microns/sec at -5C would be 65 microns in diam and migrating at 1.2 microns/sec at-1/2C. Special phenomena observed were droplet elongation, diagonal migration, and constant-velocity migration. (Author)

AD-639 873 **Field 8L, 7D**
Not available from CFSTI.
Westinghouse Electric Corp., Pittsburgh, Pa.
SOLUTE TRANSPIRATION PORES IN ICE.
Interim rept.,
by J. D. Harrison. 17 Jun 64, 4p
Contract AF 49 (638)-1029
Proj. AF-9761
Task 976102
AFOSR-66-1664
Availability: Published in Journal of Applied Physics v36 n1 p326-7 Jan 1965.

Descriptors: (*Ice, Porosity), Evapotranspiration, Salts, Solutions, Freezing, Separation, Liquids.

In the course of a recent study, ice was grown by progressive freezing of samples of water containing various solutes at different concentrations. Liquid-filled pores, here named solute transpiration pores, were frequently observed in ice which was not as sound as freshwater ice but not as cellular as sea ice. The characteristic of the solute transpiration pores, will be set forth first by describing the morphologically similar brine drainage channels and elongated bubbles followed by a description of the occurrence, form, and functioning of the pores themselves. (Author)

AD-640 150 **Field 8L**
CFSTI Prices: HC$1.00 MF$0.50
Cold Regions Research and Engineering Lab., Hanover, N. H.
TEMPERATURE DEPENDENCE AND MECHANISM OF SINTERING.
Research rept.,
by Rene O. Ramseier, and Gary W. Sander. Jul 66, 23p RR-189
Task 1V014501B52A02

Descriptors: (*Snow, Sintering), Temperature, Compacting, Low-temperature research, Ice.

The results are presented of a study of the sintering process as a function of temperature, keeping size distribution, shape, and density nearly constant. The confined compression test method was used. It is shown that the degree of sintering of snow and the rate constant as a function of temperature can be represented satisfactorily by an exponential equation. The results indicate that the sintering process is one of evaporation, diffusion through the ambient temperature, and condensation. (Author)

AD-640 151 **Field 8L, 20M**
CFSTI Prices: HC$1.00 MF$0.50
Cold Regions Research and Engineering Lab., Hanover, N. H.
HEAT OF FREEZING AND MELTING OF SEA ICE.
Research rept.,
by Duwayne Anderson. Jul 66, 22p RR-202
Task 1V014501B52A02

Descriptors: (*Sea water, Freezing), (*Ice, Thermal properties), Melting, Salinity, Transition temperature, Specific heat.

Computations are presented which show that the latent heat of freezing ice in equilibrium with sea water is less than that associated with freezing pure water at 0C. The difference is due primarily to a temperature effect that is opposed to some extent by the effect of dissolved substances in the brine. The difference probably amounts to about 7 cal/gm of ice for a brine of about 150 o/oo slinity, freezing at -8C. When the effect of this difference in the total heat required to raise the temperature and melt sea ice is computed by Schwerdtfeger's method, it is found to be of the order of 0.5 cal/gm of sea ice for an overall ice salinity of 8 o/oo and an initial temperature of -8C. The differences are small but significant and until true values are established, published values of heats of freezing and melting and specific heats of sea ice should be used with discretion. (Author)

AD-640 451 **Field 8L, 19D**
CFSTI Prices: HC$1.00 MF$0.50
Cold Regions Research and Engineering Lab., Hanover, N. H.
PRESSURE WAVE PROPAGATION IN SNOW WITH NONUNIFORM PERMEABILITY.
Research rept.,
by Yin-Chao Yen, and S. S. T. Fan. Aug 66, 16p RR-210
Task 1V014501B52A02

Descriptors: (*Snow, Wave transmission), Permeability, Mathematical analysis, Boundary value problems, Differential equations, Detonation waves, Pressure.

A mathematical analysis of pressure wave propagation through a deep layer of snow with nonuniform permeability is presented. The study extends previous investigations on porous media in which the physical properties and imposed boundary conditions have been assumed or kept constant. Two cases of boundary conditions were considered. Case I: imposed pressure at the boundary remains constant. Case II: imposed pressure at the boundary falls exponentially with time. Darcy's law was assumed to be valid. The nonlinear differential equation was solved by the finite difference technique and the results are presented in terms of dimensionless variables. (Author)

N66-27224 **Field 8L**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
THE SPECTRAL ALBEDO OF THE SNOW AND VEGETATIVE COVER.
by L. V. Dayeva, K. YA.Kondratyev, and Z. F. Mironova. Sep 63, 33p NASA-TT-F-8487
Transl. Into English From Mezhdunar. Geofiz. God. Leningr. Gos. Univ., Sb. Statei I Materialov (Leningrad), 1960, P 35-38

Descriptors: *Albedo, *Snow, *Vegetation, Clear, Cloud, Distribution, Dry, Infrared, Monochromator, Reflection, Sky, Spectral, Spectrum, U.s.s.r., Wetness.

For abstract, see S 04 15.

AD-477 715 **See Field 8C**

AD-639 660 **See Field 1E**

AD-639 691 **See Field 8M**

AD-639 809 **See Field 9E**

AD-639 945 **See Field 20A**

AD-640 454 **See Field 8K**

8M. SOIL MECHANICS

AD-639 691 **Field 8M, 8L**
CFSTI Prices: HC$3.00 MF$0.50
Cold Regions Research and Engineering Lab., Hanover, N. H.
SOILS OF THE OLPILAD RIVER REGION, ALASKA.
Research rept.,
by Jerry Brown. May 66, 58p RR-188
Proj. DA-1V014501B52A02

Descriptors: (*Soils, *Alaska), Soil mechanics, Permafrost, Terrain, Freezing, Melting, Geology, Glaciers.

Concepts of Arctic pedology are applied to the glaciated and unglaciated terrains in the vicinity of the Okpilak River, northeastern Alaska. Two types of frost action in Arctic soils are considered: (1) the surficial configurations or patterned ground, and (2) the morphological characteristics of the seasonally thawed soil and the upper zone of perennially frozen ground. About 55 types of soil conditions and surface features are described and mapped in an area encompassing both the northern Brooks Range and the southern Foothill Provinces. These include the genetic soils of Arctic Alaska, numerous soil conditions, and many of the common sorted and nonsorted circles, nets, polygons, steps, and stripes. In the glaciated and periglacial areas, sorted features predominate on the coarse-textured substrata. The Arctic brown soils are distributed on the well-drained sites along valley traverses and across mountain gradients. On a sequence of valley moraines, acid parent material is considered more important than time and mesoenvironments in influencing the depth and development of the characteristic brown solum

Weakening of the soil-forming processes with increasing altitude is suggested in the mountains. In the valleys, a podzol-like soil is observed in close proximity to the Arctic brown soils and in association with acid parent materials, dwarf birch-heath vegetation and protected microrelief positions. A combination of peaty soils associated with icewedge polygons constitutes an organic terrain. The developments of these soils under the Arctic environment are discussed. (Author)

N66-35943 **Field 8M**
CFSTI Prices HC$2.50 MF$0.75
Hayes International Corp., Birmingham, Ala.
SOIL EROSION BY LANDING ROCKETS FINAL REPORT.
by J. D. Alexander, W. M. Roberds, and R. F. Scott. 15 Jul 66, 99p NASA-CR-65484
Contract NAS9-4825
Its Eng. Rept.-1301

Descriptors: *Cratering, *Erosion, *Rocket exhaust, *Soft landing, Cold, Descent, Earth, Effect, Exhaust, Firing, Gas, Landing, Nitrogen, Retrorocket, Rocket, Soft, Soil.

For abstract, see S 04 21.

PB-173 264 **Field 8M, 13B**
CFSTI Prices: HC$4.00 MF$0.75
Iowa State Univ. of Science and Technology, Ames. Engineering Research Inst.
CHEMICAL STABILIZATION AND PHYSICO-CHEMICAL PROPERTIES OF SOILS.
Special rept.,
by Turgut Demirel. Jul 66, 106p Rept. no. 0489
Projs. HR-97, 505-S
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Soil mechanics, Roads), (*Stabilization systems, Soils), Iowa, Moisture-proofing, Epoxy plastics, Amino plastics, Styrene plastics, Rubber, Clay, Stabilization, Effectiveness.

The major conclusion resulting from the water-proofer phase of the study was that Arquad 2 HT significantly improved the shear strength of granular materials containing small amounts of clay. The following conclusions were reached concerning the water vapor clay interactions: (1) expansion of calcium montmorillonite occurs in five increments as opposed to three increments for sodium montmorillonite, (2) BET parameters for calcium montmorillonite obtained at a relative pressure range of 0-0.02 reflects adsorption on external surfaces only and those for a relative pressure range of 0.11 - 0.27 reflects adsorption on total surfaces, and (3) total free energy of immersion of calcium montmorillonite is 70 ergs/sq cm , almost twice that of sodium montmorillonite. Epoxy resins proved to be the only promising stabilizer during screening studies. Screening tests were performed for stabilizing possibilities of urea formaldehyde, polystyrene-spent sulfite liquor and reclaimed rubber, but, aside from indicating their ineffectiveness, no data were presented. Results with combinations of two epoxies indicated: (1) effectiveness of the epoxies varied inversely with clay content, (2) lime was an effective trace additive for use with epoxy, (3) epoxies required very short curing time, (4) at effective application rates ranging from 7 to 13 percent, epoxy compares unfavorably with other stabilizers because of high cost ($0.60 per pound).

PB-173 265 **Field 8M, 13B**
CFSTI Prices: HC$1.00 MF$0.50
Louisiana Dept. of Highways.
TYPICAL MOISTURE-DENSITY CURVES. PART II. LIME TREATED SOILS,
by C. M. Higgins. May 66, 14p Research rept.
RR-21, Rept. no. 0516
Proj. 61-11S
Prepared in cooperation with Bureau of Public Roads, Washington, D. C. See also AD-173 032.

Descriptors: (*Soils, Physical properties), (*Soil mechanics, Graphics), Louisiana, Roads, Foundations (Structures), Density, Moisture.

The study was made to determine whether the family of curves developed for untreated soils (Louisiana Department of Highways Research Report No. 16), could be used for determining the optimum moisture and maximum density of lime 'treated' soils. This investigation was initiated because of the extensive use of lime with plastic clays and silty clays to reduce plasticity and increase friability. The study revealed that the family of curves developed for untreated soils is suitable for use with lime treated soils. Approximately 93% of the curves for lime 'treated' soils that were checked fit the family of curves with reasonable accuracy. (Author)

PB-173 284 **Field 8M, 13B**
CFSTI Prices: HC$2.00 MF$0.50
Texas Transportation Inst., Texas A and M Univ., College Station.
AN ANNOTATED BIBLIOGRAPHY: SOIL DYNAMICS AND SOIL RHEOLOGY,
by Paul C. Chan, and T. J. Hirsch. Jun 66, 29p
Research rept. RR-33-5, Rept. no. 0370
Proj. 2-5-62-33
Prepared in cooperation with Texas Highway Dept. and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Soil mechanics, Bibliographies), (*Soils, Rheology), Texas, Deformation, Damping, Stresses, Foundations (Structures).

A thorough search of the literature has provided an annotated bibliography on Soil Dynamics and Soil Rheology. This work was performed to explore methods of determining dynamic load-deformation and damping properties of soils and to obtain the useful data that are now available. This information has been collected for Research Project No. 2-5-62-33 entitled 'Piling Behavior'. The broad objective of this project is to fully develop the computer solution of the wave equation for determining pile driving stresses and predicting pile load bearing capacity. The wave equation program uses rheological models to simulate the soil resistance on the pile during driving. Soil spring constants and damping properties are needed to simulate the behavior of the pile-soil system. (Author)

AD-640 016 **See Field 15B**

PB-172 452 **See Field 8G**

PB-173 134 **See Field 13M**

PB-173 359 **See Field 13M**

PNE-515 **See Field 19D**

PNE-603F **See Field 18C**

UCRL-12172 **See Field 18C**

8N. TERRESTRIAL MAGNETISM

AD-468 942 **Field 8N**
CFSTI Prices: HC$2.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
THE ODD ZONAL HARMONICS IN THE EARTH'S GRAVITATIONAL POTENTIAL.
Technical rept.,
by D. G. King-Hele, G. E. Cook, and Diana W. Scott. Jun 65, 43p TR-65123

Descriptors: (*Gravity, *Earth (Planet)), Scientific satellites, Satellites (Artificial), Perturbation theory, Harmonic analysis, Polynomials, Orbital trajectories, Measurement, Least square method, Errors, Inclined orbit trajectories.

The odd zonal harmonics in the Earth's gravitational potential are determined by analyzing the changes in the eccentricities of six satellites having orbital inclinations spaced as uniformly as possible between 28 degrees and 96 degrees. The most satisfactory representation of the potential is found to be in terms of four coefficients. The resulting potential is compared with that obtained by other authors. Three and five-coefficient solutions are also presented. (Author)

N66-27202 **Field 8N**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
OBSERVATION DATA OF THE SCIENTIFIC-RESEARCH DRIFTING STATIONS " SEVERNYY POLYUS-6" AND " SEVERNYY POLYUS-8", 1959-1960.
Materialy Nablyudeniy Nauchno-issledovatel'-Skikh Dreyfyushchikh Stantsiy "severnyy Polyus-6" I "severnyy Polyus-8", 1959/60 Goda
by N. A. Milyayev. Dec 63, 11p NASA-TT-F-8720
Transl. Into English From Tr. Arkticheskogo I Antarkt. Nauchno-issled. Inst. (Leningrad), V. 265, 1963 P 4-9

Descriptors: *Arctic, *Geomagnetism, *Ionosphere, Data, Drift, Element, Magnetic, Observation, Station, Table, Variation.

For abstract, see S 04 15.

N66-29366 **Field 8N**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Ames Research Center, Moffett Field, Calif.
A FLUID MODEL FOR THE INTERACTION OF THE SOLAR WIND AND THE GEOMAGNETIC FIELD.
by A. Y. Alksne, J. R. Spreiter, and A. L. Summers. 1965, 19p NASA-TM-X-56892
Submitted For Publication

Descriptors: *Continuum flow, *Flow field, *Geomagnetic field, *Solar wind, Boundary, Bow, Continuum, Data, Equation, Field, Flow, Fluid, Gas, Geomagnetism, Interaction, Layer, Magnetohydrodynamic, Magnetosphere, Parameter, Particle, Perfect, Shock, Solar, Theory, Wave, Wind.

For abstract, see S 04 16.

N66-35939 **Field 8N**
CFSTI Prices HC$3.75 MF$1.50
National Aeronautics And Space Administration, Goddard Space Flight Center, Greenbelt, Md.
LUNAR PHASE NUMBERS NU AND NU' FOR YEARS 1850 TO 2050.
by G. Fanselau, and M. Sugiura. Jun 66, 236p
NASA-TM-X-55557, X-612-66-401
Prepared In Part For Iaga-iamap Joint Comm. On Lunar Effects

Descriptors: *Geomagnetism, *Lunar phase, *Table, Apparent, Calculation, Computer, Daily, Geophysics, Integral, Lunar, Mean, Number, Phase, Program, Year.

For abstract, see S 04 21.

N66-36067 **Field 8N**
CFSTI Prices HC$4.00 MF$1.00
Smithsonian Astrophysical Observatory, Cambridge, Mass.
GEOMETRIC STRUCTURE OF THE EARTH'S GRAVITATIONAL FIELD AS DERIVED FROM ARTIFICIAL SATELLITES.
by W. Koehnlein. 28 Jan 66, 116p NASA-CR-77653, SAO SPECIAL REPT.-198
Grant NSG-87-60

Descriptors: *Earth surface, *Gravitational field, Artificial, Earth, Field, Geodesy, Geo-

metry, Gradient, Gravitational, Potential, Satellite, Structure, Surface.

For abstract, see S 04 21.

N66-36404 Field 8N
CFSTI Prices HC$2.00 MF$0.50
Rand Corp., Santa Monica, Calif.
ESTIMATED SURFACE MOTIONS OF THE EARTH'S CORE.
by R. H. Ball, A. B. Kahle, and E. H. Vestine. Aug 66, 32p NASA-CR-77935, RM-5091-NASA
Contract NASR-21/05/

Descriptors: *Core, *Earth motion, *Irrotational flow, *Rotational flow, Data, Earth, Field, Flow, Fluid, Geomagnetic, Geomagnetic field, Horizontal, Irrotational, Motion, Pattern, Rotation, Surface, Velocity, Vertical.

For abstract, see S 04 21.

AD-640 247 See Field 3B

9A. COMPONENTS

AD-458 415 Field 9A
CFSTI Price: HC$2.00
HRB-Singer, Inc., State College, Pa.
DIRECT AND INDIRECT ELECTRON CONTROL BY PHOTOCONDUCTIVE ELEMENTS.
Quarterly technical progress rept. no. 1, 1 Jun-30 Sep 64.
30 Sep 64, 31p Rept. no. 70611-1
Contract DA-44-009-AMC-579 (T)

Descriptors: (*Image intensifiers (Electronics), Electron optics), (*Infrared photoconductors, Image intensifiers (Electronics)), Night sky, Electron beams, Electron multipliers, Gain, Infrared image tubes, Mosaics (Light sensitive), Electroluminescence, Fiber optics, Electron tube parts.

The report contains the preliminary work and ideas on the means of controlling electrons by photoconductors which may make possible a night sky image converter system. Two main topics are considered: (1) modifications to mosaic type solid state image intensifiers to make them responsive to the near infrared region and (2) control of space currents in vacuum tubelike structures by photoconductors. Additional stages of gain, both visible and electron multiplication, are shown to be necessary to reach low level operation in any of the concepts. Experimental and theoretical ideas are discussed. (Author)

AD-464 167 Field 9A
CFSTI Price: HC$1.00
HRB-Singer, Inc., State College, Pa.
DIRECT AND INDIRECT ELECTRON CONTROL BY PHOTOCONDUCTIVE ELEMENTS.
Quarterly technical rept. no. 3, 20 Dec 64-20 Mar 65.
20 Mar 65, 25p Rept. no. 70611-3
Contract DA-44-009-AMC-579 (T)
See also AD-458 167.

Descriptors: (*Image intensifiers (Electronics), Electron optics), (*Infrared photoconductors, Image intensifiers), Electron beams, Tunneling (Electronics), Distribution functions, Space charges, Electron tube parts, Negative resistance circuits, Amplifiers, Cold cathode tubes, Electron guns, Filters (Electromagnetic wave), Night sky.

The temperature dependent electron energy distribution function for electric tunnel effect emitters is developed and curves corresponding to three temperatures are presented. The cumulative probability distribution function for electrons is derived and is shown to be a measure of energy spread of the tunnel electrons. Curves are given for two useful temperatures. The theoretical basis for control of electron space current by energy filtering (selection) is derived and its application to photoconductor control is shown. Gain requirements and means of achieving adequate gain are discussed. The negative resistance amplifier method is further developed and electrical requirements for the semiconductor element are detailed. (Author)

AD-464 852 Field 9A, 13H
CFSTI Price: HC$2.00
Westinghouse Electric Corp., Washington, D. C.
500 WATT SILICON POWER TRANSISTOR.
Quarterly rept. no. 5, 1 Aug-31 Oct 64.
31 Oct 64, 26p
Contract NObsr-91001
Proj. SR-0080304
Task 9347
See also AD-605 331, AD-616 612.

Descriptors: (*Transistors, Manufacturing methods), (*Silicon, Transistors), Tests, Radiofrequency power, Gain, Diffusion, Processing, Encapsulation, Electric discharges, Test equipment (Electronics), Trigger circuits, Resistance (Electrical), Oxides, Fixed contacts, Gold, Thermal properties, Test methods, Failure (Electronics).

Results of secondary-breakdown tests are discussed and developement of a power gain test is reported. The triple-diffusion fabrication process is described. Details of the encapsulation structure and characteristics are presented. (Author)

AD-467 531 Field 9A, 13H, 11F
CFSTI Prices: HC$3.00 MF$0.75
Texas Instruments, Inc., Dallas.
DEVELOPMENT OF GALLIUM ARSENIDE-PHOSPHIDE GRADED BAND-GAP BASE TRANSISTOR STRUCTURES.
Summary engineering rept. 23 Jun 64-23 Jun 65.
23 Jul 65, 87p Rept. no. TI-08-65-99
Contract NObsr-91238
Proj. SR0080301
Task 9346

Descriptors: (*Transistors, Gallium alloys), (*Gallium alloys, Epitaxial growth), Arsenic alloys, Phosphorus alloys, Processing, Vapor plating, Chlorides, Arsenic compounds, Phosphorus compounds, X-ray diffraction analysis, Reflection, Diffusion, Magnesium, Configuration, Sulfur, Electrodes, Manufacturing methods, Zinc, Impurities, Injection, Doping, Etching mobility.

The developments leading to fabrication of graded band-gap base transistor structures in gallium arsenide-phosphide are described. The material for the transistors was produced by epitaxial vapor phase deposition on GaAs substrates, using an open-tube flow system, with PCl3 and AsCl3 vapors carried over GaAs feed in a hydrogen stream. The desired composition grading for the base region was obtained by continuously varying the AsCl3-to-PCl3 ratio of the entering gases. Deposit compositions were determined by x-ray diffraction and optical reflectivity techniques, combining the latter with incremental etching to evaluate graded deposits. The transistors (n-p-n) were made by diffusing magnesium to form the base region and either alloying Au-Ge-S or diffusing sulfur through an SiO_2 film to form the emitter. The best results were obtained with the diffused emitter. Good p-n junction diodes were also made using epitaxially Zn-doped Ga (As,P). Theoretical performance calculations for both n-p-n and p-n-p graded band gap base transistor showed that the optimum configuration for high-frequency performance is n-p-n with the base region graded from GaAs to $GaAs_{0.7}P_{0.3}$. If higher mobilities can be obtained in the gap-rich compositions, improved performance could be obtained by extending the grading beyond $GaAs_{0.7}P_{0.3}$. (Author)

AD-467 595 Field 9A
CFSTI Prices: HC$2.60 MF$0.50
Microwave Electronics Corp., Palo Alto, Calif.
DEVELOPMENT OF ELECTRON GUN WITH NON-INTERCEPTING GRIDS.
Quarterly progress rept. no. 7, 28 Nov 64-28 Feb 65,
by Marshall McDonald. 28 Feb 65, 27p
Contract DA-36-039-AMC-02270 (E)
Proj. DA-1P6-22001-A-055-04

Descriptors: (*Electron guns, Electrodes), Packaging, Cathodes (Electron tubes), Electron beams, Electron tube heaters, Phase (Electronics), Traveling-wave tubes.

The gun mounting structure was redesigned to provide improved leakage paths between grids, and between the grids and cathode. Operation of the high convergence gun proved that the aligned grids operate as a non-intercepting grid over a wide range of voltages and perveances. However, beam shape was found to be poor. Heater-current phasing was found to have a significant effect on the beam profiles obtained. The 10-kw traveling-wave tube gun with aligned grids showed no change in performance after 600 hours operation. (Author)

AD-470 481 Field 9A
CFSTI Prices: HC$2.00 MF$0.50
CBS Labs., Stamford, Conn.
ALL-EVAPORATED AND MASKLESS FABRICATION TECHNIQUES FOR ACTIVE DEVICES.
Interim development rept. no. 5, 28 May-28 Aug 65.
Sep 65, 30p
Contract NObsr-87512
See also AD-465 233 and AD-453 346.

Descriptors: (*Diodes (Semiconductor), Ion bombardment), (*Semiconductor devices, Semiconducting films), Indium, Platinum, Integrated circuits, Voltage, Epitaxial growth, Silicon, Vacuum apparatus, Evaporation, Impurities, Tungsten, Oxygen, Ionization, Vapor plating, Temperature sensitive elements, Electrodes, Probes (Electromagnetic), Manufacturing methods, Resistance (Electrical), Failure (Electronics).

Identifiers: Doping, Oxygenation.

Efforts were continued on a program to develop techniques for a system of microelectronics which is fully evaporated and which maintains the advantages of the present integrated circuitry. The program has the following two objectives: the controlled deposition of epitaxial silicon films by vacuum evaporation, and the development of an ion generation focusing and deflection system for selective doping of the silicon films. The feasibility of creating well defined P-N junctions by indium ion bombardment has been demonstrated. Platinum has been substituted for oxidized tungsten as the contact ionizer. This has resulted in an improved deposition, yielding diodes of high breakdown voltage. (Author)

AD-471 662 Field 9A
CFSTI Prices: HC$3.00 MF$0.75
HRB-Singer, Inc., State College, Pa.
DIRECT AND INDIRECT ELECTRON CONTROL BY PHOTOCONDUCTIVE ELEMENTS.
Final technical progress rept. 20 Jun 64-20 Jun 65.
20 Jun 65, 73p 70611-F
Contract DA-44-009-AMC-579 (T)
See also AD-464 167.

Descriptors: (*Image intensifiers (Electronics), Electron optics), (*Infrared photoconductors, Image intensifiers (Electronics)), Night sky, Electron beams, Space charges, Triodes, Gain, Diodes, Negative resistance circuits, Electron guns, Tunneling (Electronics), Electron tube parts, Filters (Electromagnetic), Metal films, Gain, Electroluminescence, Integral equations.

This is the final report submitted under contract DA 44-009-AMC-579 (T). A summary of the work performed during the contract period is presented along with new work. The subject is that

of the use of photoconductors as control mechanisms for electron space currents in image intensifier tubes. The various approaches to controlling electrons in a vacuum are detailed and a mathematical investigation of each type is given. A figure of merit that is necessary for intensifier tubes of the types described is developed. Means of contrast gain enhancement are discussed. The thermalization of 'hot' electrons in thin metal films is extensively discussed as a way of energy filtering for special kinds of transmission grids useful in intensifiers. A new transport equation for epithermal electrons in metals is developed. (Author)

AD-471 867 **Field 9A**
CFSTI Prices: HC$3.00 MF$0.50
Radio Corp. of America, Somerville, N. J. Electronic Components and Devices.
DEVELOPMENT OF A REMOTE CUTOFF MOS FIELD EFFECT TRANSISTOR.
Interim development rept. no. 1, 10 May-10 Aug 65.
10 Aug 65, 53p
Contract NObsr-93271
Proj. SR-0080301
Task 9346

Descriptors: (*Transistors, Electric fields), Oxides, Metal films, Semiconducting films, Distortion, Automatic gain control, Attenuation, Noise (Radio), Electric currents, Resistance (Electrical), High frequency, Low frequency, Medium frequency, Very high frequency, Ultrahigh frequency, Transistor amplifiers, Radiofrequency amplifiers, Gain, Radiofrequency power.

Identifiers: Field effect transistors, MOS transistors.

The purpose of this program is to develop an advanced MOS field effect transistor having a tailored remote cutoff characteristic for decreasing cross modulation distortion and to provide improved AGC for communications receivers. The devices developed under this program are to be optimized for two frequency ranges: 14 KC to 30 MC and 200 MC to 400 MC. The stepped oxide remote cutoff MOS is superior to the ordinary triode MOS for low cross-modulation distortion. The triode MOS is poor in the high attenuation region of the automatic gain control (AGC) characteristics. In this region, the device is operated near cutoff. Initial samples of a continuously tapered oxide instead of stepped oxide have been tested and show promise. For the low frequency device, an investigation has been launched into the 1/F noise characteristics of the MOS. Measurements of noise resistance and noise currents are in progress. There appears to be a wide variation in 1/F noise characteristics in MOS transistors. (Author)

AD-639 736 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Sprague Electric Co., North Adams, Mass.
PRODUCTION ENGINEERING MEASURE FOR MECHANIZATION OF HIGH RELIABILITY CAPACITORS.
Quarterly rept. no. 14, 1 Apr-30 Jun 66,
by H. F. Phillips, and G. E. Walters. 30 Jun 66, 11p
Contract DA-36-039-AMC-01460 (E)
See also AD-636 801.

Descriptors: (*Paper capacitors, Manufacturing methods), (*Capacitors, Reliability (Electronics)), Industrial equipment, Conveyors, Machines, Production.

Modifications were completed during this period on four of the machines and a 500-capacitor trial run was made. Redesign was essential on many parts of Conveyor B before production could continue. The machinery was moved to a new environment and a 1200-capacitor trial run will be made early in the next quarter. (Author)

AD-639 841 **Field 9A, 13H, 20L**
CFSTI Prices: HC$3.00 MF$0.75
Bendix Semiconductor Div., Bendix Corp., Holmdel, N. J.
PRODUCTION ENGINEERING MEASURE FOR IMPROVEMENT OF PRODUCTION TECHNIQUES TO INCREASE THE RELIABILITY OF SILICON TRANSISTOR TYPE 2N3055.
Quarterly progress rept. no. 2, 1 Apr-30 Jun 66,
by Herman W. Baer, C. Carroll, J. Mechura, J. Papa, and H. Sivik. 30 Jun 66, 68p
Contract DA-36-039-AMC-06171 (E)
See also AD-633 012.

Descriptors: (*Transistors, Manufacturing methods), (*Reliability (Electronics), Transistors), (*Semiconductor devices, Manufacturing methods), Quality control, Silicon.

During the quarter investigations were made in the following process areas: geometry studies, mechanization studies, photo resist studies, diffusion studies, wafer requirement studies, contact metallization studies, assembly studies, and device rating studies. (Author)

AD-640 002 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
Radio Corp. of America, Somerville, N. J. Defense Microelectronics.
HIGH PERFORMANCE THIN FILMS FOR MICROCIRCUITS.
Quarterly progress rept. no. 5, 1 Mar-31 May 66,
by Franz Huber, and Walter Witt. Sep 66, 19p
CR-66-565-31
Contract DA-28-043-AMC-01230 (E)
Proj. DA-1CO-24401-A-112-04
ECOM-01230-5
See also AD-635 298.

Descriptors: (*Capacitors, *Films), (*Microminiaturization (Electronics), *Circuits), Hafnium compounds, Oxides, Semiconducting films, Sputtering, Leakage (Electrical), Anodic coatings, Electrodes.

Identifiers: Hafnium oxide.

Insulating layers of hafnium dioxide were deposited onto P-type silicon wafers. N (+) regions were diffused into the silicon wafer to act as bottom electrodes of capacitors or as source and drain electrodes of MOS field-effect devices. These FETs, containing ANODICALLY-formed oxide layers as channel insulators (AMOS), exhibited good transfer characteristics. The results of experiments proved that silicon IC technology can successfully be combined with thin-film hafnium technology, whereby only a limited number of processing steps are required to produce the necessary electrode inside the silicon wafer. The remaining parts of the active devices and all the passive components can be fabricated by the thin-film hafnium technology on the surface of the silicon substrate. Investigations of the leakage current of the anodic oxide films showed that the insulation resistance of thin-film Hf-HfO2 capacitors was similar to that of other thin-film valve metal oxide capacitors in anodic direction, and superior in the cathodic direction. (Author)

AD-640 007 **Field 9A, 20K**
CFSTI Prices: HC$2.00 MF$0.50
Air Force Cambridge Research Lab., L. S. Hanscom Field, Mass.
THEORY OF MOTION OF A THIN METALLIC CYLINDER CARRYING A HIGH CURRENT.
Geophysical research papers,
by Charles W. Dubs. Oct 56, 37p AFCRL-GRP-49, AFCRL-TR-56-208

Descriptors: (*Electric wire, Equations of motion), Theory, Electric currents, Differential equations, Cylindrical bodies, Metals, Exploding wires.

A simple-looking nonlinear differential equation of motion is found for a thin metallic cylinder carrying a high sinusoidal current. It shows the radius to be its initial value multiplied by a function depending only on two quantities, k and omega t, where t is the time and k is a parameter which depends on the initial radius and mass per unit length of the cylinder and on the amplitude and angular frequency omega of the current. The solutions obtained show the radius to decrease, gradually at first, then more and more rapidly until the cylinder collapses. The time for the cylinder to collapse depends only on k and is equal to the current rise time for a unique valud k sub o of k. A simple expression found for the radius is exact for times near zero, becomes increasingly lower than the correct radius, and finally goes to zero at a time 1 or 2% less than the correct collapse time for k near k sub o. An accurate method, also good for other current rise forms, is derived and applied for two values of k to give the radius as a function of time. The results lead to the collapse time equal to 1/2 omega (pi - 3.79 (k - k sub o)) for k near k sub o = 0.2596 plus or minus 0.0008. (Author)

AD-640 022 **Field 9A**
CFSTI Prices: HC$2.00 MF$0.50
Harry Diamond Labs., Washington, D. C.
ERROR ANALYSIS OF RC CIRCUITS COMMONLY USED FOR TIMING.
by William E. Ryan, and Ira R. Marcus. Jul 66, 37p TR-1323
Proj. HDL-66100

Descriptors: (*Timing circuits, Reliability (Electronics)), Errors, Timing devices, Electronic equipment, Resistors, Capacitors, Leakage (Electrical), Analysis, Tolerances (Mechanics).

The report analyzes various RC timing circuits commonly used in ordnance electronic timers. Timing errors are computed as a function of the component tolerances, specified to account for possible manufacturing, aging, and temperature changes. The effect of capacitor leakage is also computed. (Author)

AD-640 056 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Mallory (P. R.) and Co., Inc., Indianapolis, Ind.
PRODUCTION ENGINEERING MEASURE FOR IMPROVED RELIABILITY OF SOLID ELECTROLYTE TANTALUM CAPACITORS.
Quarterly rept. no. 12, 30 Mar-29 Jun 66,
by A. W. H. Smith. 29 Jun 66, 12p
Contract DA-36-039-AMC-03623 (E)
See also AD-636 449.

Descriptors: (*Tantalum capacitors, Manufacturing methods), Reliability (Electronics), Failure (Electronics), Electrolytic capacitors, Production control, Life expectancy.

The 85C Proof Life Test continues. A total of 34 million unit hours of test has been accumulated with one failure. This represents an overall failure rate of 0.006% per 1000 hours at the 60% confidence level. (Author)

AD-640 156 **Field 9A, 14D**
CFSTI Prices: HC$4.60 MF$0.50
Republic Aviation Corp., Mineola, N. Y. Sales and Contracts Dept.
CORDWOOD MODULE EVALUATION PROGRAM. REVISION B.
Final rept.
26 Oct 62, 46p RAC-675-Rev-B, MSD-162-966-B
Contract DA-36-039-sc-74861
See also AD-639 995.

Descriptors: (*Modules (Electronics), *Reliability (Electronics)), Environmental tests, Life expectancy, Performance (Engineering), Encapsulation, Printed circuits, Failure (Electronics), Relaxation oscillators, Inverters, Gates (Circuits), Amplifiers.

The Cordwood modules designed are typified by high-density packaging of standard, military-approved components that are assembled by conventional methods. Densities of 200,000 components per cubic foot have been achieved with the relatively low-cost, standard components. The modules are fabricated by stacking components perpendicularly between two printed-circuit boards and encapsulating the entire assembly in epoxy resin. The encapsulated module has a cubical shape. Component leads extending from one side of the cube are used for external connections. After encapsulation, the modules can operate reliably under extreme environmental conditions -- 100 percent humidity, temperatures from -55 degrees C to 85 degrees C, and shock and vibration to 100 g. (Author)

AD-640 204 **Field 9A**
CFSTI Prices: HC$3.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J.
STUDY OF PRE-OSCILLATORY BEHAVIOR OF CROSSED-FIELD MICROWAVE TUBES.
Technical rept.,
by Park Richmond. Aug 66, 59p ECOM-2746
Proj. DA-1P6-22001-A-055
Task 1P6-22001-A-055-04-18

Descriptors: (*Crossed field devices, Microwave equipment), Electron optics, Noise (Radio), Electron beams, Test equipment (Electronics).

The report discusses a series of experiments to study the noise behavior of planar crossed-field beams. The study was divided into two phases. The first phase included the design of the electron optics system and the construction of several versions of a beam tester to evaluate the design. In the second phase, a design for an experimental noise tube was evolved using the electron optics system developed in the first phase. A tube was also constructed and a series of noise measurements was made during this phase. The noise was measured as a function of longitudinal position along the beam using an X-band cavity for several values of beam position and over a 2-to-1 current range. Noise variations were observed along the length of the beam, but the spacing between noise peaks was not related to the operating parameters in any simple manner. No noticeable growth of noise along the beam was observed; however, an increase in the noise level was noted as the cathode emission became totally space-charge-limited. (Author)

AD-640 239 **Field 9A, 9E**
CFSTI Prices: HC$3.00 MF$0.75
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
STUDY OF RECEIVER MIXER CHARACTERISTICS.
Final rept. no. 4, 1 Jun 65-1 Aug 66,
by E. E. Donaldson Jr, and R. W. Moss. Sep 66, 75p A-868-F
Contract DA-28-043-AMC-01426 (E)
Proj. DA-1E6-20501-D-449
ECOM-01426-F
See also AD-633-743.

Descriptors: (*Mixer tubes, Electrical properties), (*Mixers (Electronics), Performance (Engineering)), Diodes, Pentodes, Transistors, Triodes, Phase shift, Mathematical prediction, Circuits.

The report summarizes a thirteen month program concerned with the investigation of spurious product formations in conventional mixer circuits, and with the development of techniques whereby the levels of such formations could be predicted from limited measurements of mixer parameters. The interference characteristics of diode, pentode, triode, and transistor mixer types were investigated for numerous ordered arrangements of mixer dc parameters, circuit configurations, and signal injection levels. The results have demonstrated that changes in the mode of signal and/or local oscillator injection, local oscillator level, mixer load conditions, or mixer dc voltages produce changes in response levels which are apparently unpredictable, and that attempts to develop prediction models based on discrete mixer parameters may be impractical. Tests were conducted on a diode mixer which verify that multiple mix products can occur due to signal and/or local oscillator harmonic injection, and that the levels of such products are dependent upon the phase orientation of the injected signals. Tests were also conducted which show the effects of mixer bias voltage on response phase position. A spurious response prediction technique for diode mixers previously developed at Georgia Tech was investigated to determine if modifications and improvements could be made to reduce prediction errors, and if this technique could be successfully applied to other mixer types. Maximum-upper-bound prediction methods which might give worst-case approximations of spurious response levels were also investigated. Prediction results are presented which were derived from the actual prediction of numerous data sets on diode, pentode, triode, and transistor mixers. (Author)

AD-640 281 **Field 9A, 17B, 20L**
Not available from CFSTI.
British Columbia Univ., Vancouver. Dept. of Physics.
DIRECT TUNNEL-CURRENT NOISE IN TUNNEL DIODES FOR SMALL BIASES.
Master's thesis,
by B. E. Turner, and R. E. Burgess. 19 Nov 63, 14p
Grant AF-AFOSR-61-91
Proj. AF-9767
Task 976702
AFOSR-66-1595
Availability: Published in Canadian Journal of Physics v42 p1046-1057 Jun 1964.

Descriptors: (*Tunnel diodes, Noise (Radio)), Tunneling (Electronics), Band theory of solids, Semiconductors.

The Esaki theory describing the current components arising from direct interband tunneling in tunnel diodes has previously been used to predict a relation between the noise spectrum of direct-tunneling currents and the p-n junction voltage (Pucel 1961). In this paper is presented experimental confirmation of this relation, which provides a sensitive test of the Esaki formulation for tunneling currents and indicates as well, that the noise spectrum is independent of the band structure of the semiconductor and that the two oppositely flowing tunnel currents are uncorrelated. These facts form a basis for examining the extent to which the Esaki formulation can be generalized and the relation independent of band structure, between the direct tunnel-current noise spectrum and the applied junction voltage. (Author)

AD-640 297 **Field 9A, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ELECTROCHEMICAL TRANSDUCERS FOR ACOUSTIC SIGNAL RECEPTION AND SMALL-DISPLACEMENT MEASUREMENTS.
by N. S. Lidorenko, and I. N. Moiseev. 25 Apr 66, 12p FTD-TT-65-1875
TT-66-62438
Unedited rough draft trans. of Elektrotekhnika (USSR), v36 n3 p3-5 1965.

Descriptors: (*Electroacoustic transducers, Electrochemistry), USSR, Acoustics, Measurement, Signals.

Electrochemical pickups for reception of acoustic signals and measurement of small displacements are described; their basic characteristics are given. (Author)

AD-640 308 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
Redstone Scientific Information Center, Redstone Arsenal, Ala.
DIFFERENTIATION CIRCUITS FOR AMPLITUDE-MODULATED SIGNAL ENVELOPES,
by V. I. Anisimov, and Yu. F. Likhodievskii. 16 Aug 66, 12p RSIC-583
TT-66-62443
Trans. of Priborostroenie (USSR) n5 p41-6 1964.

Descriptors: (*Differentiating circuits, Radio signals), USSR, Modulators, Demodulators, Amplitude modulation, Circuits.

Two differentiation circuits for amplitude-modulated signal envelopes in which the functions of the modulator and the demodulator are accomplished by one switch are examined in this article. A serious problem arising during the designing of a system with signal modulation is the creation of economic and stable compensation circuits. There are two basic methods of compensation circuits which operate on alternating current. The first method is compensation by sections of alternating current which are different resonance circuits tuned to the carrier frequency. On the strength of this such circuits are extremely critical to changes of the carrier frequency and magnitudes of the self-capacitances, inductances, and resistances. The second method is compensation with double conversion of the signal frequency. (Author)

AD-640 329 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
Rome Air Development Center, Griffiss AFB, N. Y.
A METHOD OF DETERMINING THE COMPARATIVE SHIELDING EFFECTIVENESS OF CABLES, DUCT AND CONDUIT.
Final rept.,
by George A. Long. Sep 66, 12p RADC-SP-66- 5
Proj. AF-4540
Prepared for presentation at the Annual Wire and Cable Symposium to be held at the Hotel Shelburne, Atlantic City, N. J., 7, 8, and 9 Dec 1966.

Descriptors: (*Electric cables, Shielding), (*Ducts, Shielding), (*Pipes, Shielding), Effectiveness, Test methods, Leakage (Electrical), Coaxial cables.

To make comparative measurements on coaxial, a length of the cable is confined in a shielded room, shorted at the far end and connected to a matching signal generator placed outside the room. The resulting leakage radiation from the cable is then measured with a frequency selective voltmeter. Another cable with different shielding qualities is then subjected to the same measurement and the difference between the two measurements is an indication of the comparative shielding qualities of the cables. Duct and conduit can also be measured for shielding effectiveness in the same manner by making them into a type of coaxial cable. This is accomplished by running a conductor down the interior of the duct or conduit. This conductor is of such a size, and place in such a position to make the enclosure characteristic resistance match the signal generator. A time domain reflectometer is used in assembling these enclosures. With this instrument the positioning of the conductor becomes an easy task because it displays the variation in impedance along the full length of the enclosure. Adjustment for a good match is accomplished easily. The technique is very useful when one type of cable or duct is to be compared with another, or to show up improvements in duct or conduit designs. (Author)

AD-640 484 **Field 9A, 13H, 20L**
CFSTI Prices: HC$1.00 MF$0.50
Motorola, Inc., Phoenix, Ariz. Semiconductor Products Div.
PRODUCTION ENGINEERING MEASURE FOR SILICON NPN SWITCHING TRANSISTORS.
Quarterly progress rept. no. 3, 25 Nov 65-25 Feb 66,
by Mark Siegel, and Jack Freese. 25 Feb 66, 17p
Contract DA-36-039-AMC-06164 (E)
See also AD-637 114.

Descriptors: (*Manufacturing methods, Transistors), (*Silicon, *Transistors), (*Semiconductor devices, Switching circuits).

Areas of progress during the quarter were as follows: (1) Evaluation of decreased substrate resistivity initiated. (2) Evaluation of increased breakdown voltage range initiated. (3) Tests of increased diffusion source time completed. (4) Evaluation probe measurements reviewed and standardized. (5) New emulsion developer installed. (6) Evaluation of photoresist coating thickness versus spin velocity completed. (7) Refined oxide etching techniques. (8) Preliminary evaluation of centrifuged KMER completed. (9) Investigation of metallization thicknesses versus pattern definition initiated. (10) Evaluation of experimental header capacitances completed. (11) All testing completed on Engineering Sample No. 1 units. (12) Engineering Sample No. 2 units delivered to the customer. (Author)

N66-27038 **Field 9A**
CFSTI Prices HC$3.00 MF$0.75
Westinghouse Electric Corp., Baltimore, Md. Electronics Div.
CIRCUITS AND CIRCUIT TESTING FOR SPACEBORNE REDUNDANT DIGITAL SYSTEMS SPECIAL TECHNICAL REPORT NO. 3.
by H. Brinker, and A. R. Helland. Sep 63, 92p NASA-CR-55424
Contract NASW-572

Descriptors: *Circuit reliability, *Logic circuit, *Redundant system, Analysis, Circuit, Data, Design, Digital, Electric, Equipment, Failure, Ground, Integration, Logic, Magnetic, Majority, Rate, Redundancy, Reliability, Semiconductor, Spacecraft, Support, System, Testing.

For abstract, see S 04 15.

N66-27212 **Field 9A**
CFSTI Prices HC$1.00 MF$0.50
Marine Engineering Lab., Annapolis, Md.
SOLID-STATE CIRCUIT DEVELOPMENT.
by P. P. Liwski. Apr 65, 24p NASA-CR-75380, MEL-283/64

Descriptors: *Electric power conversion, *Silver-cadmium battery, *Switching circuit, Battery, Cadmium, Cell, Circuit, Conversion, Current, Electric, Monitor, Power, Satellite, Sensing, Silver, Solar, Solid, Solid state, State, Switching, Voltage.

For abstract, see S 04 15.

N66-27537 **Field 9A**
CFSTI Prices HC$1.00 MF$0.50
Atomics International, Canoga Park, Calif.
INVESTIGATION OF CURRENT DEGRADATION PHENOMENON IN SUPERCONDUCTING SOLENOIDS THIRD QUARTERLY PROGRESS REPORT, 15 JAN. - 15 APR. 1965.
by L. C. Salter Jr. 1965, 9p NASA-CR-75382
Contract NAS8-5356

Descriptors: *Electric current, *Niobium alloy, *Solenoid, *Superconductor, *Titanium alloy, Alloy, Current, Electric, Field, Heat, Magnetic, Niobium, Stability, Test, Titanium, Treatment, Wire.

For abstract, see S 04 15.

N66-27945 **Field 9A**
CFSTI Prices HC$1.00 MF$0.50
Itt Industrial Labs., Fort Wayne, Ind.
RESEARCH IN THE DEVELOPMENT EFFORT OF AN IMPROVED MULTIPLER PHOTOTUBE SIXTH QUARTERLY REPORT.
by F. H. Barr, and E. H. Eberhardt. 30 Mar 66, 25p NASA-CR-75610, ITTIL-66-1018
Contract NASW-1038

Descriptors: *Current density, *Electronic equipment, *Photomultiplier, Cathode, Characteristics, Correlation, Count, Current, Dark, Density, Photocathode, Sensitivity, Temperature, Thermal.

For abstract, see S 04 15.

N66-27958 **Field 9A**
CFSTI Prices HC$2.00 MF$0.50
Texas Instruments, Inc., Dallas. Materials And Controls Div.
THE DEVELOPMENT OF A STANDARD FOR MULTILAYER PRINTED CIRCUIT BOARDS BY MEANS OF RESEARCH, DEVELOPMENT, AND TESTING FINAL REPORT.
15 Nov 65, 37p NASA-CR-75572, TI-04-65-38
Contract NAS8-11712

Descriptors: *Circuit board, *Environmental testing, *Multilayer structure, *Printed circuit, Board, Characteristic, Circuit, Control, Current, Design, Electronic, Environment, Failure, Impedance, Material, Multilayer, Print, Process, Size, Structure, Testing, Voltage, Welding.

For abstract, see S 04 15.

N66-28377 **Field 9A**
CFSTI Prices HC$1.00 MF$0.50
Space Craft, Inc., Huntsville, Ala.
PREMODULATION FILTERS FINAL REPORT.
Apr 66, 17p NASA-CR-65376
Contract NAS9-4393

Descriptors: *Circuit, *Filter, *Modulation technique, Coupling, Design, Direct current (dc), Modulation, Noise, Operation, Reconstruction, Rejection, Signal, Technique, Transformer.

For abstract, see S 04 15.

N66-29082 **Field 9A**
CFSTI Prices HC$6.00 MF$1.50
Westinghouse Electric Corp., Lima, Ohio. Aerospace Electrical Div.
IMPROVED MAGNETIC COMPONENTS FOR STATIC INVERTERS AND CONVERTERS, PART 1 EIGHTH QUARTERLY REPORT, 31 MAR. - 31 AUG. 1965.
by R. E. Mc vay. 1965, 247p NASA-CR-54963, WAED-66-13E
Contract NAS3-2792

Descriptors: *Converter, *Electric property, *Inverter, *Magnetic property, *Material testing, Ac, Alloy, Current, Electric, Iron, Magnetic, Material, Property, Sine, Square, Static, Testing, Wave.

For abstract, see S 04 16.

N66-29418 **Field 9A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
A SYSTEM OF SERIES CONNECTED PHOTOELECTRIC CELLS.
Anordnung Zur Reihenschaltung Von Lichtelektrischen Zellen
by E. Falkenthal. May 63, 5p NASA-TT-F-8437
Transl. Into English Of German Patent No. 655927, Jan. 1938

Descriptors: *Electric connector, *Photoelectric cell, Cell, Connection, Connector, Electric, Electrode, Layer, Light, Photoelectric, Series, System.

For abstract, see S 04 16.

N66-29457 **Field 9A**
CFSTI Prices HC$1.00 MF$0.50
Research Triangle Inst., Durham, N. C.
SILICON NEEDLE TRANSDUCER.
by R. R. Stockard, and J. J. Wortman. 1966, 11p NASA-CR-74474
Contract NASR-222
Presented At 1966 Intern. Solid-state Circuits Conf., Philadelphia

Descriptors: *Piezoelectricity, *Semiconductor device, *Silicon, *Transducer, Accelerometer, Alignment, Device, Fabrication, Junction, Needle, P-n junction, Practical, Semiconductor, Stress.

For abstract, see S 04 16.

N66-29683 **Field 9**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration Lewis Research Center, Cleveland, Ohio.
FACTORS IN DESIGNING PRINTED CIRCUIT FOR SPACE.
by D. H. Hardy. 1966, 15p NASA-TM-X-5221

Descriptors: *Circuit board, *Handbook, *Printed circuit, Board, Circuit, Conductor, Design, Electronic, Layout, Print, Space flight.

For abstract, see S 04 16.

N66-29758 **Field 9**
CFSTI Prices HC$3.00 MF$0.75
Cbs Labs., Stamford, Conn. Jet Propulsion Lab Calif. Inst. Of Tech., Pasadena.
THE DEVELOPMENT OF STERILIZABLE IMAGE DISSECTOR TUBES FINAL REPORT 15 APR. 1964 - 15 MAY 1966.
by J. Z. Karpinski. 15 May 66, 65p NASA-CR-76036
Contracts NAS7-100, JPL-950784
Prepared For Jpl

Descriptors: *Alkali, *Electrostatic instrument, *Image dissector tube, *Photocathode, Cathode, Cycling, Dissection, Electrostatic, Fabrication, Image, Instrument, Photomultiplier, Response, Sensitivity, Sterilization, Substrate, Thermal, Tube.

For abstract, see S 04 16.

N66-29973 **Field 9**
CFSTI Prices HC$4.00 MF$0.75
Martin Co., Orlando, Fla.
INFRARED TESTING OF ELECTRONIC COMPONENTS FINAL REPORT, 5 APR. 1965 - 5 JUN. 1966.
by G. Chadderdon, T. L. Hartman Jr, and W. R. Randle. Jun 66, 115p NASA-CR-76080, OR-8347
Contract NAS8-20131

Descriptors: *Electric equipment, *Electronic equipment, *Infrared radiation, *Nondestructive testing, Analysis, Circuit, Electric, Electronic, Equipment, Expectancy, Failure, Heat, Infrared, Life, Nondestructive, Print, Radiation, Sink, Testing, Thermal, Transistor.

For abstract, see S 04 16.

N66-35580 **Field 9**
CFSTI Prices HC$3.00 MF$0.75
Microwave Electronics Corp., Palo Alto, Calif.
DEVELOPMENT OF A LOW NOISE, COLD-CATHODE TRAVELING-WAVE TUBE FINAL REPORT, 25 JUN. 1964 - 31 AUG. 1965.
by G. Foggiato. Sep 66, 109p NASA-CR-71842
Contract NAS5-9002
With Rept. From Stanford Res. Inst.

Descriptors: *Cold cathode, *Electron source, *Traveling wave tube, Cathode, Cold, Electron, Frequency, Low noise, Oxide, Solid, Source, State, Test, Titanium, Traveling, Tube, Wave.

For abstract, see S 04 21.

N66-35733 **Field 9A**
CFSTI Prices HC$4.00 MF$0.75
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
ADVANCED DIGITAL CIRCUIT R AND D EVALUATION FINAL REPORT, 3 OCT. 1964 - 30 SEP. 1965.
by R. M. Stock. 1965. 115p NASA-CR-68246. CAL-UD-2002-X-1
Contract NAS8-11412

Descriptors: *Data handling system, *Integrated circuit, *Saturn ib launch vehicle, Adapter, Circuit, Complexity, Data, Digital, Handling, Integration, Launch vehicle, Logic, Noise, Power, System, Temperature, Wiring.

For abstract, see S 04 21.

N66-35768 **Field 9A**
CFSTI Prices HC$4.00 MF$0.75
Materials Research Corp., Orangeburg, N. Y.
FABRICATION AND DELIVERY OF NON-DESTRUCTIVE READ OUT MEMORY BUFFERS USING LAMINATED LAYER TECHNIQUE SUMMARY TECHNICAL REPORT.
by R. J. Carpenter, T. P. Janus, and N. Kenny. Jun 66. 110p NASA-CR-77488, MRC-549
Contract NAS8-11986

Descriptors: *Foil, *Magnetic memory, *Material testing, *Memory storage unit, Buffer, Card, Electronics, High speed, Lamination, Magnetic, Material, Memory, Nondestructive, Program, Reader, Readout, Storage, System, Testing, Unit.

For abstract, see S 04 21.

N66-35773 **Field 9A**
CFSTI Prices HC$2.00 MF$0.50
Research Triangle Inst., Durham, N. C.
SOME EFFECTS OF MECHANICAL STRESS ON THE BREAKDOWN VOLTAGE OF P-N JUNCTIONS.
by J. R. Hauser, and J. J. Wortman. 1966. 38p NASA-CR-77627
Contract NASR-222
Submitted For Publication

Descriptors: *Electric property, *P-n junction, *Semiconductor device, *Stress-strain time relation, Anisotropy, Band, Break, Dependence, Device, Diode, Down, Electric, Gap, Germanium, Junction, Property, Relation, Selenium, Semiconductor, Strain, Stress, Time, Transistor, Voltage.

For abstract, see S 04 21.

N66-35975 **Field 9A**
CFSTI Prices HC$2.00 MF$0.50
Hughes Aircraft Co., Culver City, Calif. Aerospace Group.
DEVELOPMENT OF THREE TYPES OF FLAT FLEXIBLE CONDUCTORS FINAL REPORT, AUG. 1963 - FEB. 1964.
by C. F. Seck. 24 Feb 65. 43p NASA-CR-77775, TP-594
Contract NAS8-5424

Descriptors: *Electric conductor, *Flexibility, *Plastic coating, Cable, Coating, Conductor, Electric, Flat, Material, Plastic, Property, Rubber, Shielding, Silicon.

For abstract, see S 04 21.

N66-35985 **Field 9A**
CFSTI Prices HC$2.00 MF$0.50
Itt Industrial Labs., Fort Wayne, Ind.
RESEARCH IN THE DEVELOPMENT EFFORT OF AN IMPROVED MULTIPLIER PHOTOTUBE SEVENTH QUARTERLY REPORT.
by F. H. Barr, and E. H. Eberhardt. 24 Jun 66. 37p NASA-CR-77766, ITTIL-66-1037
Contract NASW-1038

Descriptors: *Cathode, *Photomultiplier, *Pulse amplitude, Amplitude, Characteristics, Data, Diameter, Distribution, Efficiency, Incoming, Pulse, Quantum, Radiation, Response, Test, Time.

For abstract, see S 04 21.

N66-36057 **Field 9A**
CFSTI Prices HC$3.00 MF$0.75
Texas Instruments, Inc., Dallas.
STUDY OF SOLID-STATE INTEGRATED MICROWAVE CIRCUITS SCIENTIFIC REPORT NO. 2, 15 DEC. 1965 - 14 MAR. 1966.
31 Mar 66. 75p NASA-CR-77802
Contract NAS12-75

Descriptors: *Frequency modulation, *Integrated circuit, *Microwave circuit, *Telemetry, *Transmitter, Bandwidth, Circuit, Configuration, Control, Frequency, Integration, Microwave, Modulation, Parameter, Solid, State, System.

For abstract, see S 04 21.

N66-36115 **Field 9A**
CFSTI Prices HC$2.50 MF$0.75
Hughes Aircraft Co., Fullerton, Calif.
TRANSISTOR DESIGN EFFECTS ON RADIATION RESISTANCE.
by C. C. Berggren, V. R. Honnold, and G. D. Thomas. Sep 66. 73p NASA-CR-590
Contract NAS1-4595

Descriptors: *Carrier, *Radiation resistance, *Silicon transistor, Degradation, Design, Device, Effect, Emission, High frequency, Majority, Proton, Prototype, Radiation, Resistance, Response, Semiconductor, Silicon, Space, Transistor.

For abstract, see S 04 21.

N66-36299 **Field 9A**
CFSTI Prices HC$3.00 MF$0.75
Israel Program For Scientific Translations, Ltd., Jerusalem.
TRANSFLUXORS AND THEIR APPLICATION IN AUTOMATION AND REMOTE CONTROL.
by L. D. Kravchenko. 1966. 58p NASA-TT-F-347, TT-66-51032
Transl. Into English Of The Publ. "transflyuksory V Ustroistvakh Teleupravleniya" Kiev, Izd. Tekhn., 1964, 2d Ed. Published For Nasa And Nsf

Descriptors: *Electricity, *Magnetic core, *Transistor, Characteristics, Circuit, Core, Design, Electric, Flux, Magnetic, Performance, U.s.s.r..

For abstract, see S 04 21.

ORNL-3972 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
TABLE OF THE RATIO B/SUB MAX/FOR MAGNET COILS WITH RECTANGULAR CROSS SECTION AND UNIFORM CURRENT DENSITY.
by M. W. Garrett. Aug 66. 9p
Contract W-7405-eng-26

Descriptors: (*Magnet coils, Design), Tables.

For abstract, see N 20 20.

AD-639 703 **See Field 12B**

AD-639 803 **See Field 9C**

AD-639 862 **See Field 5E**

AD-639 863 **See Field 5E**

AD-639 865 **See Field 5E**

AD-639 918 **See Field 14D**

AD-639 966 **See Field 5E**

AD-640 064 **See Field 20I**

AD-640 087 **See Field 5E**

AD-640 090 **See Field 5E**

AD-640 092 **See Field 5E**

AD-640 235 **See Field 15E**

AD-640 453 **See Field 9E**

AD-640 481 **See Field 20E**

AD-640 529 **See Field 18H**

9B. COMPUTERS

AD-443 108 **Field 9B**
CFSTI Price: HC$3.00
Stanford Electronics Labs., Stanford Univ., Calif.
SYNTHESIS OF THRESHOLD LOGIC NETWORKS.
by John E. Hopcroft. Apr 64. 69p Technical rept. TR-6764-1, SU-SEL-64-023
Contract DA-04 (200)-AMC-57 (Z)

Descriptors: (*Networks, Computer logic), (*Switching circuits, Synthesis), Functions, Adaptive control systems, Algebras, Combinatorial analysis, Design, Pattern recognition, Linear programming, Mapping (Transformations), Inequalities, Scheduling.

This research develops an original synthesis procedure for designing a threshold logic network to realize an arbitrary switching function with a minimum number of threshold logic units. An algorithm is developed that converts an originally nonlinearly separable problem into a number of linearly separable problems by specifying the intermediate outputs in a threshold logic network. These linearly separable problems are then solved by already existing techniques, such as linear programming. The synthesis procedure is extended to cover the more general synthesis problem of realizing two or more switching functions with a multiple-output network having the fewest number of threshold logic units. Some of the techniques developed in this research are applicable to the field of adaptive systems. In particular, a procedure is given for adapting the weights of a threshold logic unit that will terminate for both linearly separable and nonlinearly separable problems. (Author)

AD-474 976 **Field 9B**
CFSTI Prices: HC$21.20 MF$1.25
International Business Machines Corp., Rockville, Md.
AN ARCHITECTURAL STUDY FOR A SELF-REPAIRING COMPUTER.
Final technical documentary rept., 3 May-1 Nov 65,
by P. W. Agnew, D. H. Rutherford, R. J. Suhocki, C. M. Yen, and D. E. Muller. Nov 65. 216p Rept. no. 65-928091
Contract AF-04 (695)-769
Proj. AF-3176
SSD-TR-65-159

Descriptors: (*Computers, Spaceborne), Maintenance, Design, Algorithms, Models (Simulations), Systems Engineering, Aerospace craft, Programming (Computers), Malfunctions, Failure (Mechanics), Operation, Reliability (Electronics).

Identifiers: Self-repairing computer.

A self-repairing computer is a computer which has the capabilities to continue to work correctly even if some of the elements of which it is composed malfunction. This report presents the work resulting from phase 1 of an architectural study for a

self-repairing computer. In particular, the technique of 'partitioning' was investigated as a means for achieving a computer capable of self-repair. Partitioning is the technique of essentially dividing a computer into diagnostic subsystems. Design of a hypothetical (but realistic) aerospace computer is given. Partitioning and formation of diagnostic subsystems, including the investigation of appropriate diagnostic procedures, is described. This report shows that the partitioning technique provides the means for self-diagnosis. It is relatively easy to apply to microprogrammed systems. The study has also shown that a combination of four general logical techniques (high redundancy, coding, mode change and diagnosis) is needed to achieve a computer of maximum operational availability. The computer which is described is capable of self-diagnosis and is considered to be an experimental vehicle for study of self-repair techniques and computer. It required approximately 22% additional CPU hardware. The hardcore which consists of those components whose failure to function properly would cause the computer to operate incorrectly is estimated to be 1%.

AD-639 673 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J.
SERIAL PCM DATA BUFFER.
Technical rept.,
by M. B. Pickover, and T. Kesolits. Aug 66, 28p ECOM-2745
Proj. DA-036-039-03186E

Descriptors: (*Data transmission systems, Design), (*Digital systems, Design), Computer logic, Multiplex, Pulse code modulation.

Identifiers: PCM multiplexers, PCM data buffer.

The insertion of digital information into the PCM stream of the AN-TCC 44,45,46 and 47 multiplexers was accomplished. Advanced development models were completed. The theoretical considerations are presented as well as typical applications of complete systems. (Author)

AD-639 675 **Field 9B**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
ALGORITHMIC LANGUAGES PROJECT.
Final rept. 1 Jul 65-30 Jun 66,
by Seymour Ginsburg. 7 Jul 66, 13p TM-738/026/00
Contract AF 19 (628)-5166
Proj. AF-5632
Task 563205
AFCRL-66-562
See also AD-628 202, AD-628 203, AD-628 204, AD-628 205, AD-624 939, AD-629 309, AD-630 424, AD-631 337, AD-636 032, and AD-638 194.

Descriptors: (*Programming languages, *Algorithms), Context free grammars, Context sensitive grammars, Mathematical logic, Mathematical models.

The purpose of this paper is to review and summarize the results presented in ten scientific reports during the contract period. (Author)

AD-639 734 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Lincoln Lab., Mass. Inst. of Tech., Lexington.
ON-LINE GRAPHICAL SPECIFICATION OF COMPUTER PROCEDURES.
Technical rept.,
by W. R. Sutherland. 23 May 66, 36p TR-405
Contract AF 19 (628)-5167
Proj. AF-649L
ESD-TR-66-211

Descriptors: (*Graphics, *Programming (Computers)), Documentation, Automatic.

Identifiers: On-line systems.

A promising area of application for recently developed computer graphics techniques is computer programming. Two important considerations in using an interactive graphics system for drawing programs are (1) the form of a pictorial programming notation and (2) methods for making a computer execute the program once drawn. These topics are discussed in the context of an experimental graphical programming system running on the Lincoln Laboratory TX-2 Computer. This system uses a block notation for programs and can execute the drawn program with an interpreter. Improved graphical input languages for drawing programs and program notations which combine appropriate features of pictorial and written languages are needed before applications in this area are practical. The benefits to be expected from a graphical approach to programming include (1) automatic documentation, (2) debugging assistance, and (3) natural expression of parallel processes. (Author)

AD-639 837 **Field 9B, 5C, 6D**
CFSTI Prices: HC$5.00 MF$1.00
RAND Corp., Santa Monica, Calif.
SOVIET CYBERNETICS TECHNOLOGY: VII, ALGEC - REPORT ON AN ALGORITHMIC LANGUAGE FOR ECONOMICS CALCULATIONS (PRELIMINARY VERSION),
by M. A. Korolev. Sep 66, 157p RM-5135-PR
Contract AF 49 (638)-1700
TT-66-62381
Trans. of mono. Soobshchenie ob Algoritmicheskom Yazyke dlya Ekonomicheskikh Raschetov 'ALGEK', n.p., 19 Jun 1964. See also AD-624 290.

Descriptors: (*Cybernetics, USSR), (*Programming languages, *Economics), (*Algorithms, Economics), Compilers, Computational linguistics, English language, Russian language, Bibliographies, Programming (Computers).

Identifiers: ALGEC, ALGOL.

A working version is given of an expansion of the international high-level computer language ALGOL 60 to meet Soviet economic planning needs. A committee headed by M. A. Korolev was directed by the Soviet government to create such a language. ALGEC converts ALGOL 60 for use with the Cyrillic alphabet, provides for handling text, editing, list processing, and for access to individual items on lists and arrays. The RAND translators of the Russian draft show all changes from the original ALGOL 60. ALGOL conventions ignored by the author have been restored, and ambiguities clarified. Definitions of terms and syntactic units have been indexed. Russian-English and English-Russian glossaries of all ALGOL and ALGEC terms and an annotated bibliography of 12 RAND publications on Soviet cybernetics technology are appended. (Author)

AD-639 839 **Field 9B**
CFSTI Prices: HC$6.00 MF$1.25
Illinois Univ., Urbana. Dept. of Computer Science.
QUARTERLY TECHNICAL PROGRESS REPORT, JANUARY, FEBRUARY, MARCH 1966.
Mar 66, 209p
Research supported in part by contracts and grants from ONR, NSF and AEC. See also AD-631 991.

Descriptors: (*Computers, Scientific research), Circuits, Programming (Computers), Pattern recognition, Numerical methods and procedures, Compilers.

Contents: Circuit research program; Hardware systems research; Software systems research programs; Illinois pattern recognition computer; ILLIAC III; Numerical methods, computer arithmetic and artificial languages; Computational physics; ILLIAC II service, use, and program development; IBM service, use, and program development; Problem specifications; General laboratory information.

AD-640 069 **Field 9B**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
DEVELOPMENT OF DISCRETE DIGITAL SIMULATION LANGUAGES,
by Philip J. Kiviat. 22 Sep 66, 15p P-3453
Prepared for publication in Simulation, the monthly journal of Simulation Councils, Inc.

Descriptors: (*Programming languages, Digital computers), Simulation, Time, Dynamics, Reviews.

The article deals with a particular type of simulation: the use of numerical and logical models to represent discrete changes of state of a system as it moves through time. Simulation models of this type are usually formulated symbolically using flow charts or logic diagrams, coded in some programming language, and run on a digital computer. The report presents the history, current status and possible future of discrete digital simulation languages -- computer languages that are used for describing the structure and dynamics of discrete-time systems. (Author)

AD-640 188 **Field 9B, 6D**
Not available from CFSTI.
Purdue Univ., Lafayette, Ind. Control and Information Systems Lab.
A HEURISTIC APPROACH TO REINFORCEMENT LEARNING CONTROL SYSTEMS.
Revised ed.,
by M. D. Waltz, and K. S. Fu. 5 Apr 65, 12p
Grants AF-AFOSR-62-351, NSF-GP-2183
AFOSR-66-1509
Revision of manuscript submitted 3 Nov 64. See also AD-611 935.
Availability: Published in IEEE Transactions on Automatic Control vAC10 n4 p390-8 Oct 1965.

Descriptors: (*Learning machines, *Control systems), Artificial intelligence, Bionics, Analog-digital computers, Set theory, Probability.

Identifiers: Reinforcement (Psychology).

The paper describes a learning control system using a reinforcement technique. The controller is capable of controlling a plant that may be nonlinear and nonstationary. The only a priori information required by the controller is the order of the plant. The approach is to design a controller which partitions the control measurement space into sets called control situations and then learns the best control choice for each control situation. The control measurements are those indicating the state of the plant and environment. The learning is accomplished by reinforcement of the probability of choosing a particular control choice for a given control situation. The system was stimulated on an IBM 1710-GEDA hybrid computer facility. Experimental results obtained from the simulation are presented. (Author)

AD-640 266 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
JOSS: ARITHMETIC AND FUNCTION EVALUATION ROUTINES,
by I. D. Greenwald. Sep 66, 48p RM-5028-PR
Contract AF 49 (638)-1700

Descriptors: (*Programming (Computers), *Functional analysis), Numerical analysis, Transcendental functions, Compilers.

Identifiers: JOSS, Time sharing (Computers), Arithmetical operations.

A description is given of the programming of arithmetic and function evaluation routines for JOSS from a programmer's point of view. JOSS functions are divided into three groups: arithmetic operations (including exponential and square root),

elementary transcendental functions, and number dissection functions. The four arithmetic operations (add, subtract, multiply, divide) and square root treat the operands as exact nine-digit numbers and produce true results rounded to nine digits. Descriptions of the arithmetic routines are presented in gross verbal flow-charts, amplified by commentaries. The discussion of the transcendental functions emphasizes the analysis done to achieve almost nine-significant-digit accuracy in the results and shows how special cases are handled to hit certain 'magic' values on the nose. Program flows of the number dissection functions demonstrate how a sophisticated tool may be supplied to the user with trivial expenditure of programming effort. (Author)

AD-640 267 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
JOSS: CONSOLE SERVICE ROUTINES (THE DISTRIBUTOR),
by I. D. Greenwald. Sep 66, 34p RM-5044-PR
Contract AF 49 (638)-1700

Descriptors: (*Programming (Computers), *Compilers), Real time.

Identifiers: JOSS, Time sharing (Computers).

A description is given of the function of the JOSS distributor, which handles all input and output from the user stations and teletypes. A major design criterion was to prevent 'stare-down,' a condition in which the computer and a console may be waiting for each other. The distributor makes certain that each console is in the appropriate state, transmits and encodes all input and output, keeps all lines within allowed lengths, ensures that characters are not lost during carriage returns and page changes, and sees that upper or lower case is printed according to user's typewriter shift. When the console is turned off, the distributor disables the station while the monitor 'tidies up,' and then enables it for the next user. An Appendix contains program documentation, consisting of a Station Control Register table and the nine console service routines. (Author)

AD-640 294 **Field 9B, 9D**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
SCIENTIFIC TECHNICAL INFORMATION NO. 6, 1964: SELECTED ARTICLES.
21 Jun 66, 48p FTD-TT-65-1880
TT-66-62436
Unedited rough draft trans. of Nauchno-Teckhnicheskaya Informatsiya (USSR), n6 p25-36 1964.

Descriptors: (*Computer storage devices, Information retrieval), (*Information theory, *Coding), USSR, Subject indexing, Reports.

Identifiers: Associative tag memory, Associative retrieval, Coordinate indexing.

A search for information on sensual codes, by L. E. Pshenichnaya and E. F. Skorokhodko: Explained are principles, which are the basis of experimental information-search systems, developed at the cybernetics institute of the Academy of Sciences Ukr-SSR. The content of documents and inquiries is presented in form of sensual codes, reflecting important signs of corresponding concepts. Methods of selecting a multivalent answer from associative memory, by V. F. Rudakov and Ye. I. Il'yashenko: Discussed is a method of extracting multivalent answer from associative memory with an individual detector per word, at which for selection of all words, corresponding to the given associative criterion, is necessary only one inquiry of the memory part of associative memory with subsequent turning only to detector matrix. Proposed are two systems of detector matrix. System I reduces to terminal minimum the number of turning to the detector matrix, it is distinguished by high speedy action, but requires more equipment. According to system II the amount of equipment is sharply reduced, but the time of inquiring the detector matrix increases somewhat. This system is convenient for associative memory of greater volume. Given are experimental results, confirming the possibility of realizing the proposed systems of detector matrix. (Author)

AD-640 306 **Field 9B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
CONSIDERATION OF INFALLIBILITY ASPECTS WHEN PLANNING BASIC SYSTEMS OF DIGITAL MACHINES,
by A. Kojemski, and Z. Swiatkowski. 6 Apr 66, 9p FTD-TT-65-1654
TT-66-62441
Unedited rough draft trans. of Przeglad Elektroniki (Poland) v5 n5 p252-5 1964.

Descriptors: (*Digital computers, Reliability (Electronics)), Switching circuits, Poland, Management planning.

Treatise on the necessity and methods for attaining reliability in the circuits and components of computers.

AD-640 311 **Field 9B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
FOUR STATES OF THE MAGNETIC MEMORY,
by A. Galich. 18 Apr 66, 6p FTD-TT-65-1667
TT-66-62446
Unedited rough draft trans. of Pravda, Leningrad (USSR), 24 Aug p4 1964.

Descriptors: (*Computer storage devices, Magnetic core storage), USSR, Ferrites, Magnetic cores, Electric currents.

Is it possible to create an electronic computing machine of such dimensions as the modern ones have, but working twice or three times as fast. It is possible but for this it is necessary to construct a memory device not with two electrically stable states, as in the case of the existing elements, but three or four. Not long ago in the Soviet Union there was created such a two-opening ferrite magnetic element, the 'sager.' It has four stable states. Simultaneously, there is determined a complex of electrical signals, each of which corresponds to one of four symbols and serves for transmitting information from one memory element to another. The 'sager' possesses the advantage that the information is passed from one element of the memory to another only along one channel of communication for one cycle, which assures the maximum rapidity of action. These properties make it possible to use the 'sager' for quarternary computing machines. Research has shown that by simple technical media there can be distinguished in one circuit only four states - absence of current, movement of current in one direction, movement of current in the other direction, and alternate movement of the current in the two directions. The use of other combinations of electrical signals requires either the creation of apparatus with a great number of cycles or the introduction into one channel of communication of complicated logic devices for distinguishing the signals transmitted from one memory element to another. (Author)

AD-640 321 **Field 9B, 8E, 22C**
CFSTI Prices: HC$6.00 MF$1.50
Wolf Research and Development Corp., Bladensburg, Md. Applied Sciences Dept.
UNIFIED GEODETIC PARAMETER PROGRAM (GEOPS). VOLUME I OF II- MATHEMATICAL ANALYSIS.
Final technical rept. 8 Dec 64-25 Mar 66,
by H. R. Kahler, and W. T. Wells. 25 Mar 66, 278p
Contract DA-44-009-AMC-878 (X)

Descriptors: (*Programming (Computers), *Geodesics), Mathematical analysis, Perturbation analysis, Perturbation theory, Satellite tracking systems, Celestial mechanics.

Identifiers: GEOS satellite.

A detailed mathematical description is presented associated with the computer program which will recursively obtain minimum variance estimates of orbital parameters, geopotential coefficients, station locations, and tracking systems error model coefficients from measurements taken by diverse electronic and optical tracking systems.

AD-640 322 **Field 9B, 8E, 22C**
CFSTI Prices: HC$3.00 MF$0.75
Wolf Research and Development Corp., Bladensburg, Md. Applied Sciences Dept.
UNIFIED GEODETIC PARAMETER PROGRAM (GEOPS). VOLUME II OF II - PROGRAM DESCRIPTION.
Final technical rept. 8 Dec 64-25 Mar 66,
by T. H. Rau, P. M. Mason, and G. E. Prine. 25 Mar 66, 96p
Contract DA-44-009-AMC-878 (X)
See also AD-640 321.

Descriptors: (*Programming (Computers), *Geodesics), Perturbation theory, Satellite tracking systems, Celestial mechanics.

Identifiers: GEOS satellite, ANNA satellite.

The report presents a complete description of the programming aspects of the GEOPS program. Written in FORTRAN IV for the IBM-7094 computer, the program utilizes full core storage and ten magnetic tapes during its execution. The glossary of symbols contains all those eimportant to the computational logic. Program flow is described both from an overall and from an individual routine viewpoint. Compilation procedures, computational logic, and input-output specifications are presented. The reader should, at any time, have reference to an actual listing of the program. Two associated, supplementary programs, an equinox tape generator and an input data pre-processor, are also described in this report. (Author)

AD-640 493 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Carson Labs., Inc., Bristol, Conn.
OPTICAL MATRIX MULTIPLIER.
Final rept., Jul 65-Jun 66,
by Arthur N. Carson. Aug 66, 26p
Contract AF 19 (628)-4311
Proj. AF-4641
Task 464104
AFCRL-66-619
See also AD-617 961.

Descriptors: (*Analog computers, Combinatorial analysis), (*Computer storage devices, Crystals), Color centers, Matrix algebra, Optical phenomena, Computer logic, Data processing systems, Halides, Lasers, Scanning.

Identifiers: Optical computers, Analog multipliers.

Development work has been performed on a parallel, analog, matrix multiplier for the rapid multiplication of very large capacity matrices using optical storage of matrix elements in a colored crystal memory and parallel optical multiplication. The original concept for the system, based on the use of three colored crystals (two for matrix-element storage, and one for multiplication) and three wavelengths of light for storage, readout, and multiplication, respectively, was modified and simplified. The final concept used only two crystals to perform the dual function of storage and multiplication, and two colors of light; it also incorporated the technique of continuous monitoring during storage to eliminate the requirement for linearity of color conversion during storage. The principal final difficulty at completion of the contract was the inability to demonstrate adequate color conversion rates in writing matrix elements into the colored crystal to assure an interesting practical dev-

ice. Several promising avenues for removing this limitation with further development were described. A laboratory bench-model matrix multiplier was constructed and used to demonstrate matrix element monitoring and multiplication. (Author)

AD-640 504 **Field 9B, 5D**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
SYMPOSIUM IN KIEV: COMPUTER TECHNOLOGY AND THE HISTORY OF SCIENTIFIC AND TECHNICAL PROGRESS.
10 Oct 66, 7p LT-66-56
TT-66-62470
Trans. of Istoriya SSSR n4 p232-3 Jul-Aug 1966. Compiled from reports of V. N. Klimeniuk (Kiev), K. B. Gelman-Vinogradov and L. G. Khromenko (Moscow).

Descriptors: (*Scientific research, History), (*Computers, Scientific research), USSR, Symposia, Information retrieval, Punched cards, Archaeology, Social sciences, Automation, Czechoslovakia.

Identifiers: URAL computers, Technology.

IDO-17151 **Field 9B, 6R**
CFSTI Prices: HC$6.00 MF$1.25
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
RSAC A RADIOLOGICAL SAFETY ANALYSIS COMPUTER PROGRAM,
by R. L. Coates, and N. R. Horton. May 66, 212p
Contract AT (10-1)-205

Descriptors: (*Programming (Computers), *Radiological dosage).

For abstract, see N 20 20.

NBS-TN-410 **Field 9B, 20H**
CFSTI Prices: HC$0.25 MF$0.50
National Bureau of Standards, Washington, D. C. Inst. for Basic Standards.
IMPROVED FORTRAN PROGRAM FOR SINGLE PARTICLE ENERGY LEVELS AND WAVE FUNCTIONS IN NUCLEAR STRUCTURE CALCULATIONS.
Technical note,
by Randall S. Casewell. 30 Sep 66, 33p
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20402 $0.25.

Descriptors: (*Programming (Computers), *Nuclear structure), Nuclear shell models, Wave functions, Nuclear energy levels, Programming language.

Identifiers: FORTRAN.

An improved program has been developed for numerical calculations of single particle energy levels and wave functions for Woods-Saxon or other real potential wells. The program is designed to be used as a subroutine of a larger program for nuclear structure calculation but may be used separately if desired. Improvements over the previous program include: (1) for bound states the wave function is calculated by integrating outward from zero radius and inward from a maximum radius beyond the nuclear potential well with matching at an intermediate radius; (2) a first order correction has been made to the starting conditions at small radius for the integration of the wave function; (3) a large step size is used until the calculation has nearly converged on the eigenvalue; then a small step size is used to provide maximum accuracy; (4) the correction of a small error in the Kutta-Runge integration procedure has been made. As a result of the changes the program is approximately five times faster than the previous version. Checks with harmonic oscillator potentials give an accuracy of .01% in the energy level values. Listings of Fortran II and Fortran IV versions are given. (Author)

N66-27226 **Field 9B**
CFSTI Prices HC$7.00 MF$1.75
Maryland Univ., College Park.
MAMOS - A MONITOR SYSTEM UNDER IBSYS FOR THE IBM 7090/7094.
by A. E. Beam. May 66, 314p NASA-CR-488
Grant NSG-398

Descriptors: *Ibm 7090 computer, *Ibm 7094 computer, *Monitor, Computer, Data, Library, Operation, Processing, Program, Subroutine, System.

For abstract, see S 04 15.

N66-27750 **Field 9B**
CFSTI Prices HC$3.00 MF$0.75
Alabama Univ., University. Bureau Of Engineering Research.
A STUDY OF HIGH-SPEED AD AND DA CONVERTERS USING REDUNDANCY TECHNIQUES INTERIM REPORT, MAY 10, 1963 - MAY 9, 1964.
by C. C. Carroll, and H. Mott. Jun 64, 86p
NASA-CR-75473
Contract NAS8-5341

Descriptors: *Analog-to-digital converter, *Redundancy encoding, *Voltage amplifier, Amplitude, Analog, Bit, Block, Circuit, Comparator, Comparison, Converter, Decoder, Diagram, Digital, Encoding, High speed, Sensitivity, Three, Voltage.

For abstract, see S 04 15.

N66-27933 **Field 9B**
CFSTI Prices HC$5.00 MF$1.00
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
DESIGN OF COUNTUP-COUNTDOWN MACHINES.
by G. J. Moshos. 1965, 164p NASA-TM-X-57637

Descriptors: *Computer method, *Differential analyzer, *Digital computer, *Real time, Analyzer, Binary, Circuit, Computer, Counter, Differential, Digital, Method, Multiplier, Pulse, Rate, Real, Synthesis, Time.

For abstract, see S 04 15.

N66-27942 **Field 9B**
CFSTI Prices HC$3.00 MF$0.75
Space Technology Labs., Inc., Redondo Beach, Calif.
TRACKING ACCURACY MATRIX PROCESSOR (TAPP MOD III).
by W. W. Lemmon. 11 Dec 63, 79p NASA-CR-75579, STL-8976-6027-RU-000
Contracts NAS7-100, JPL-950045

Descriptors: *Computer program, *Matrix analysis, *Tracking, Analysis, Buffer, Code, Computer, Control, Diagram, Flow, Input, Language, Matrix, Model, Noise, Optional, Output, Prediction, Processor, Program, Regression, Trajectory, Transformation.

For abstract, see S 04 15.

N66-28749 **Field 9B**
CFSTI Prices HC$4.00 MF$1.00
Oak Ridge National Lab., Tenn.
INSTRUCTIONS FOR THE OPERATION OF CODES ASSOCIATED WITH THE LOW-ENERGY INTRANUCLEAR CASCADE CALCULATION.
by H. W. Bertini, H. E. Francis, and M. P. Guthrie. Mar 66, 149p NASA-CR-75895, ORNL-3844
Contract NASA ORDER R-104, W-7405-ENG-26

Descriptors: *Binary code, *Computer method, *Nucleon, *Particle collision, *Pion, Binary, Calculation, Cascade, Code, Collision, Computer, Histogram, Incidence, Low energy, Method, Particle, Program.

For abstract, see S 04 16.

N66-29338 **Field 9B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
AUTOMATIC ANALOG COMPUTER CONTROL BY MEANS OF PUNCHED CARDS - " CRESSIDA I".
Controle Automatique Des Calculateurs Analogiques A L'aide De Cartes Perforees - "cressida I"
by A. Van wauve. Apr 64, 28p NASA-TT-F-8843
Transl. Into English Of Cetis Rept. No. 46, Brussels, Euratom, Apr. 1962

Descriptors: *Analog computer, *Automatic data processing system, *Punched card, Analog, Automatic, Card, Component, Computer, Conversion, Coupling, Data, Digital, Function, Input, Output, Processing, Punch, Static, System.

For abstract, see S 04 16.

N66-29966 **Field 9B**
CFSTI Prices HC$3.75 MF$1.25
National Aeronautics And Space Administration, Washington, D. C.
FORECASTS AND APPRAISALS FOR MANAGEMENT EVALUATION, VOLUME 1.
1965, 229p NASA-SP-6009, VOL. 1

Descriptors: *Apollo spacecraft, *Management planning, *Operations research, *Performance prediction, *Weight analysis, Computer, Control, Data, Evaluation, Forecasting, Handling, Management, Operation, Performance, Planning, Research, System, Weight.

For abstract, see S 04 16.

N66-36059 **Field 9B**
CFSTI Prices HC$3.00 MF$0.75
California Univ., La Jolla. Scripps Inst. Of Oceanography.
COMPUTER PROGRAMS EMX AND EMX2 FOR ELECTRON MICROPROBE DATA PROCESSING.
by R. W. Fitzgerald, J. Z. Frazer, and A. M. Reid. 20 Jun 66, 77p NASA-CR-77805, SIO-66-14
Grant NSG-317-63, Contract AF-AFOSR-631-64

Descriptors: *Computer program, *Data processing, *Electron probe, *Microanalysis, Coding, Computer, Correction, Data, Electron, Fortran, Input, Probe, Procedure, Processing, Program.

For abstract, see S 04 21.

N66-36132 **Field 9B**
CFSTI Prices HC$4.00 MF$0.75
Midwest Research Inst., Kansas City, Mo.
USER'S MANUAL FOR A FORTRAN IV PROGRAM FOR COMPUTING FLUTTER BOUNDARIES OF FLAT PANEL ARRAYS IN SUPERSONIC FLOW.
by D. R. Kobett, and D. I. Sommerville. 8 Jul 66, 105p NASA-CR-66121
Contract NAS1-4900

Descriptors: *Computer program, *Flutter analysis, *Panel flutter, *Supersonic flow, Analysis, Array, Boundary, Computer, Flat, Flow, Flutter, Fortran, Ibm 7090 computer, Manual, Panel, Program, Supersonic.

For abstract, see S 04 21.

PB-170 935 Field 9B
CFSTI Prices: HC$14.60 MF$1.00
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
LE TRAITEMENT DE LISTES EN PROGRAMMATION. SLIP: LANGAGE DE LISTES SYMETRIQUE-APPLICATIONS. (Programming List Processes. SLIP: Symmetric List Processor - Applications).
Doctoral thesis,
by Yvon Broudin. Jun 66, 146p CEA-R-3040
Text in French; Summary in English.

Descriptors: (*Programming languages, Reviews), (*Programming (Computers), Reviews), Multiple operation, Scheduling, Optimization, France.

Identifiers: List processing, SLIP (Systematic List Processor), Time sharing (Computers).

Modern aspects of programming languages are essentially turned towards list processing. The ordinary methods of sequential treatment become inadequate and we must substitute list processes for them, where the cells of a group have no neighbourhood connection, but where the address of one cell is contained in the preceding one. These methods are required in 'time sharing' solving problems. They also allow us to treat new problems and to solve others in the shortest time. Many examples are presented after an abstract of the most usual list languages and a detailed study of one of them : SLIP. Among these examples one should note : locating of words in a dictionary or in a card index, treatment of non numerical symbols, formal derivation. The problems are treated in FORTRAN II on an IBM 7094 machine. The subroutimes which make up the language are presented in an appendix. (Author)

PB-173 129 Field 9B, 5B
CFSTI Prices: HC$3.60 MF$0.50
Lehigh Univ., Bethlehem, Pa. Center for the Information Sciences.
DOCUMENT RETRIEVAL THEORY, RELEVANCE, AND THE METHODOLOGY OF EVALUATION.
Rept. no. 4 on Canonical Decomposition,
by David M. Reed, and Donald J. Hillman. 12 Aug 66, 36p
Grant NSF-GN-451
Rpet. on NSF Scientific Documentation Project. See also PB-170 971 and PB-170 970.

Descriptors: (*Programming (Computers), Subject indexing), (*Computational linguistics, Subject indexing), Information retrieval, Computers, Coding, Compilers, Indexes, Documentation, Grammars.

Identifiers: LECOM.

A computer program is described for reducing the strings of categories produced by the microcategorization procedure to their canonical components. These are strings of categories having the form of a sentence expressing a relation. Document characteristics are then easily identifiable within the set of canonical components. The program has two parts, the first of which amalgamates certain microcategories into longer units termed 'macrocategories'. The second part consists of rules for reducing macrocategory strings to canonical strings. A distinction is made between document characteristics and index terms, and it is shown that the latter are definable in terms of the former. (Author)

UCRL-14931 Field 9B, 20I, 12A
CFSTI Prices: HC$3.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
ONE-DIMENSIONAL MAGNETOHYDRODYNAMICS CODE,
by Daniel Steinberg. 7 Jun 66, 48p
Contract W-7405-eng-48

Descriptors: (*Programming (Computers), *Magnetohydrodynamics).

For abstract, see N 20 19.

AD-443 107 See Field 6D
AD-461 244 See Field 6D
AD-464 398 See Field 9F
AD-639 671 See Field 18K
AD-639 692 See Field 22C
AD-639 705 See Field 12B
AD-639 714 See Field 5I
AD-639 733 See Field 20J
AD-639 782 See Field 17G
AD-639 783 See Field 17G
AD-639 955 See Field 12A
AD-640 058 See Field 6K
AD-640 100 See Field 5B
AD-640 101 See Field 5B
AD-640 102 See Field 5B
AD-640 103 See Field 5B
AD-640 104 See Field 5B
AD-640 105 See Field 5B
AD-640 106 See Field 5B
AD-640 107 See Field 5B
AD-640 108 See Field 5B
AD-640 109 See Field 5B
AD-640 110 See Field 5B
AD-640 111 See Field 5B
AD-640 112 See Field 5B
AD-640 113 See Field 5B
AD-640 114 See Field 5B
AD-640 115 See Field 5B
AD-640 116 See Field 5B
AD-640 117 See Field 5B
AD-640 118 See Field 5B
AD-640 119 See Field 5B
AD-640 120 See Field 5B
AD-640 121 See Field 5B
AD-640 122 See Field 5B
AD-640 123 See Field 5B
AD-640 124 See Field 5B
AD-640 125 See Field 5B
AD-640 126 See Field 5B
AD-640 128 See Field 5B
AD-640 130 See Field 5B
AD-640 268 See Field 6D
AD-640 283 See Field 5B
AD-640 396 See Field 20F
AD-640 447 See Field 9F
AD-640 457 See Field 9E
AD-640 462 See Field 9E
ANL-6950 See Field 18J
ANL-7165 See Field 7D
HW-82771 See Field 7B
LA-3466 See Field 20D
NAA-SR-11944 See Field 21F
N66-28271 See Field 6D
N66-29967 See Field 22B
ORNL-3931 See Field 7E
PB-173 016 See Field 15E
PB-173 017 See Field 15E
PB-173 126 See Field 5B
PB-173 320 See Field 12A
PB-173 356 See Field 13M
PB-173 357 See Field 13M
PB-173 358 See Field 13M

9C. ELECTRIC AND ELECTRONIC ENGINEERING

AD-639 698 Field 9C, 12B
CFSTI Prices: HC$3.00 MF$0.75
Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
SENSITIVITY OF A SECOND-ORDER OPTIMAL CONTROL SYSTEM TO PLANT PARAMETER VARIATIONS.
Master's thesis,
by Weston Arthur Roe. Jun 66, 91p GGC/EE/66-16

Descriptors: (*Control systems, Sensitivity), Synthesis, Calculus of variations, Optimization, Performance (Engineering).

Identifiers: Theses.

The time-optimal controller, synthesized by application of the Maxumum Principle of Pontryagin, is an open-loop controller and is unresponsive to variations in the plant parameters. The sensitivity of the second-order regulator system was defined as the variation in the terminal state when forced by the nominal control law, and the variation in the performance index when forced by the actual-optimal control law. Both sensitivities were found to be functionals of the initial conditions, control magnitude, plant parameter variations, and time. The initial conditions corresponding to minimum sensitivity were an initial velocity and zero displacement. (Author)

AD-639 706 Field 9C, 6D
CFSTI Prices: HC$3.00 MF$0.50
Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
INVESTIGATION OF THE CHARACTERISTICS OF A NEURON-LIKE NETWORK USED TO CONTROL AN OPPOSING-ACTUATOR DEVICE.
Master's thesis,
by James Thomas Medley. Jun 66, 58p GGC/EE/66-14

Descriptors: (*Bionics, *Servomechanisms), Control systems, Model theory, Synchros.

Identifiers: Theses.

A neural network controlled muscle system is designed and built using an electronic neuron model as the basic element to form the network, and an opposing-actuator device, composed of two electromagnetic solenoids, as the 'prime mover.' The system is analyzed with the help of a variable impedance muscle stimulator previously used for live muscle testing. The static and dynamic characteristics of the model resemble those of a live muscle. Parameters of the network are varied to determine their effects on the system. (Author)

AD-639 803 **Field 9C, 9D, 6P, 10A K**
CFSTI Prices: HC$6.00 MF$1.50
Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
SEMI-ANNUAL RESEARCH SUMMARY, FOURTH, JANUARY THROUGH JUNE 1966.
Jun 66, 279p
Research supported in part by contracts and grants from AFCRL, NSF and NASA.

Descriptors: (*Scientific research, Reports), Electrophysiology, Speech, Control systems, Information theory, Electric power production, Energy conversion, Electromagnetic fields, Communication systems, Circuits, Field theory, Millimeter waves, Magnetic materials, Semiconductors, Solid state physics, Films.

Topics included are: Medical and life sciences; control and information systems; Electric power systems, electromechanical energy conversion and electromagnetic fields; Communication sciences, nonlinear circuits and systems, quantum electronics and millimeter waves; Materials.

AD-640 014 **Field 9C**
CFSTI Prices: HC$2.00 MF$0.50
Federal Aviation Agency, Washington, D. C. Environmental Development Div.
MODULAR SOLID STATE UNINTERRUPTIBLE POWER SYSTEM.
Final rept.,
by Alexander Kusko. Sep 66, 49p
Proj. 450-101-05E
SRDS-RD-66-61

Descriptors: (*Power equipment, Solid state physics), (*Modules (Electronics), Power equipment), Rectifiers, Batteries +components, Inverter circuits, Circuits, Reliability (Electronics), Redundant components, Silicon controlled rectifiers, Failure (Electronics), Semiconductor devices, Transients.

This report shows that the requirements for a Modular Solid State Uninterruptible Power System (UPS), as described in Specification FAA-ER-450-012, can be met using solid-state-circuit and inverter techniques available today. Each module will consist of a rectifier-battery-inverter assembly capable of operating from either commercial power, standby engine generators or internal battery power, and delivering continuous, uninterruptible, regulated, three-phase a-c power to its load. The UPS must be designed so that each module of a typical four-module system will have an MTBF of the order of 1100 hours and an MTTR of one hour to meet the system MTBF requirement of 100,000 hours. The UPS must also be designed so that the output voltage during all switching and fault clearing operations falls within a voltage-time envelope which the electronic load equipment can tolerate. (Author)

AD-640 425 **Field 9C**
CFSTI Prices: HC$3.00 MF$0.75
Human Resources Research Office, George Washington Univ., Alexandria, Va.
PREPARATION OF MAINTRAIN TROUBLESHOOTING MANUALS.
Working paper,
by James P. Rogers, and Julia S. Harris. Oct 64, 89p

Descriptors: (*Handbooks, Electronic technicians), (*Maintenance, *Electronic equipment), Preparation.

Identifiers: Troubleshooting.

The purpose of this guide is to assist engineers, writers, and illustrators in the preparation of improved manuals for use in the troubleshooting of complex electronic equipment. It is assumed that the users of this guide are experienced in the preparation of the kinds of manuals traditionally supplied for use in troubleshooting, i.e., schematic diagrams, functional diagrams, block diagrams, etc. It is also assumed that the users are familiar with the military specifications regarding accuracy, art requirements, preparation of printers copy, etc. Chapter 1 discusses the general procedure for preparing these manuals. Subsequent chapters deal in more detail with specific sections of troubleshooting manuals. (Author)

AD-640 430 **Field 9C, 13G, 14B, 17G K**
CFSTI Prices: HC$3.00 MF$0.75
Aerospace Technology Div., Library of Congress, Washington, D. C.
ELECTROMECHANICAL SYSTEMS: SUMMARY OF DATA.
Rept. no. 3 on Work assignment no 72.
20 Jun 66, 61p ATD-66-74
TT-66-62457
Based on Soviet-Satellite open sources pub. 1963-1966. Rept. on Surveys of Foreign Scientific and Technical Literature.

Descriptors: (*Fluid amplifiers, Automation), (*Gyroscopes, Performance (Engineering)), (*Electromechanical converters, Electrical engineering), (*Accelerometers, Performance (Engineering)), (*Clocks, Mechanical engineering), USSR, Abstracts, Control systems, Pneumatic devices, Semiconductor devices, Integrators, Inertial navigation, Transducers, Mechanics.

The report consists of 24 abstracts and translations which are divided into five sections: I. Fluid computers (1 translation); II. Gyroscopic systems and integrators (6 abstracts); III. Electromechanical instruments (1 translation, 3 abstracts), IV. Accelerometers (2 translations, 5 abstracts); V. Mechanical systems (6 abstracts). The translation in Section I concerns a conference on pneumohydraulic automation. Section II includes information on gyroscopic integrators and inertial systems. The translation in Section III concerns an investigation of an electromechanical trigger regulator with a potential actuator. Other devices covered include a change-over switch for pneumatic signals, a magnetohydrodynamic transducer, and a semiconductor miniature pressure sensor. Section IV discusses various types of accelerometers including string accelerometers and a compensating-type integrating accelerometer. In Section V the dynamic model of a clock and the theory of clock springs are investigated. There is no bibliography. (Author)

N66-27033 **Field 9C**
CFSTI Prices HC$6.00 MF$1.50
Westinghouse Electric Corp., Baltimore, Md. Surface Div.
RESEARCH ON FAILURE FREE SYSTEMS FINAL REPORT.
by H. Brinker. Dec 63, 249p NASA-CR-56686, WGD-38521
Contract NASW-572

Descriptors: *Circuit reliability, *Electronics, *Failure, *Integrated circuit, *Redundant system, Airborne, Circuit, Detection, Ground, Integration, Method, Processing, Redundancy, Reliability, Signal, Support, System, Test.

For abstract, see S 04 15.

N66-27198 **Field 9C**
CFSTI Prices HC$6.00 MF$1.25
Westinghouse Electric Corp., Baltimore, Md.
RESEARCH ON FAILURE FREE SYSTEMS WITH SUPPLEMENTAL INFORMATION FINAL REPORT.
Dec 63, 225p NASA-CR-57011
Contract NASW-572

Descriptors: *Redundant system, *Self-repairing system, Circuit, Computer, Failure Free, Logic, Mission, Redundancy, Reliability, Self-repairing, Simulation, System.

For abstract, see S 04 15.

N66-27210 **Field 9C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
CALCULATING THE PERFORMANCE RELIABILITY OF SYSTEMS CONTAINING A LARGE NUMBER OF ELEMENTS.
O Metodakh Rascheta Nadezhnosti Raboty Sistem, Soderzhashchikh Bol'shoye Chislo Elementov
by V. I. Siforov. Nov 63, 16p NASA-TT-F-8705
Transl. Into English From Izv. Akad. Nauk Sssr, Otd. Tekh. Nauk (Moscow), No. 6, 1954 P 3-12

Descriptors: *Component reliability, *Element abundance, *Performance prediction, Abundance, Automatic, Calculation, Component, Damage, Design, Duration, Element, Performance, Prediction, Quantity, Ratio, Reliability, Replacement, Tube.

For abstract, see S 04 15.

N66-27320 **Field 9C**
CFSTI Prices HC$7.00 MF$1.75
Tennessee Univ., Knoxville. Dept. Of Electrical Engineering.
ON MINIMUM FUEL AND ENERGY CONTROL OF SAMPLED- DATA CONTROL SYSTEMS SCIENTIFIC REPORT NO. 12.
by J. C. Hung, and A. M. Revington. 30 May 66, 310p NASA-CR-75407
Grant NSG-351

Descriptors: *Nonlinear feedback, *Pulse amplitude modulation (pam), *Sampled data system, Amplitude, Control, Data, Energy, Feedback, Fuel, Modulation, Nonlinear, Plant, Pulse, Sample, System.

For abstract, see S 04 15.

N66-27961 **Field 9C**
CFSTI Prices HC$5.00 MF$1.00
Case Inst. Of Tech., Cleveland, Ohio. Digital Systems Lab.
A COMPENSATED PULSE-DATA RELAY SERVOMECHANISM.
by W. D. Mc leod. 1965, 152p NASA-CR-75578, EDC-1-65-32
Grant NSG-36-60

Descriptors: *Digital data, *Information processing, *Servomechanism, Circuit, Compensation, Control, Data, Digital, Dither, Equation, Feedback, Flip-flop, High frequency, Information, Input, Linearization, Loop, Processing, Pulse, Quantizer, Relay, Reliability, Resolution, System, Variable.

For abstract, see S 04 15.

N66-27963 **Field 9C**
CFSTI Prices HC$1.00 MF$0.50
Alabama Univ., University. Dept. Of Electrical Engineering.
A DEVELOPMENT OF THE DESCRIBING FUNCTIONS FOR TWO NONLINEARITIES SEPARATED BY A LINEAR FUNCTION FINAL REPORT, 1 SEP. 1965 - 1 FEB. 1966.
by R. E. Lueg. 15 May 66, 20p NASA-CR-75533
Grant NSG-381

Descriptors: *Feedback control system, *Nonlinearity, *Transfer function, Amplitude, Analysis, Block, Control, Description, Electronic, Equation, Feedback, Frequency, Function, Hysteresis, Linear, Response, Servomechanism, System, Transfer.

For abstract, see S 04 15.

N66-28453 Field 9C
CFSTI Prices HC$3.00 MF$0.75
Northeastern Univ., Boston, Mass. Electronics Research Lab.
RELIABLE SOLID-STATE CIRCUITS SEMIANNUAL REPORT NO. 2, JUN. 1 - NOV. 30, 1965.
by R. E. Bach Jr, A. W. Carlson, G. F. Currin, and C. A. Furciniti. 1 Jan 66, 82p NASA-CR-75724
Contract NGR-22-011-007

Descriptors: *Microminiaturized electronic equipment, *Pulse width modulation (pwm), *Semiconductor device, *Solid state device, Circuit, Device, Electronic, Equipment, Microminiaturization, Modulation, Power, Pulse, Semiconductor, Solid, Stage, State, Width.

For abstract, see S 04 16.

N66-28454 Field 9C
CFSTI Prices HC$1.00 MF$0.50
Commonwealth Scientific And Industrial Research Organization, Sydney (Australia).
SYNTHESIS OF IMPROVED FEEDS FOR LARGE CIRCULAR PARABOLOIDS.
by H. Minnett, and B. M. Thomas. 1966, 14p NASA-CR-75690, RPP-1003
Grant NSG-240-62
Presented At The Conf. On The Design And Construct. Of Large Steerable Aerials, London, 6-8 Jun. 1966

Descriptors: *Antenna field, *Feed system, *Parabolic reflector, *Synthesis, *Waveguide, Antenna, Cylinder, Efficiency, Electromagnetic, Feed, Field, Hybrid, Mode, Noise, Parabolic, Pattern, Propagation, Radar, Radiation, Reflector, System.

For abstract, see S 04 16.

N66-28833 Field 9C
CFSTI Prices HC$4.00 MF$1.00
University Of Southern Calif., Los Angeles. Electronic Sciences Lab.
SOLID STATE, APPLIED ELECTROMAGNETICS AND PLASMAS, AND INFORMATION SCIENCES RESEARCH CONSOLIDATED SEMIANNUAL PROGRESS REPORT NO. 3, 1 OCT. 1965 - 31 MAR. 1966.
1966, 147p NASA-CR-75859
Contracts NGR-05-018-022, AF 04/695/-746

Descriptors: *Electronics, *Information processing, *Semiconductor, *Solid state physics, Bibliography, Cadmium, Chemistry, Defect, Electromagnetism, Ferromagnetism, Information, Physics, Processing, Propagation, Solid, State, Sulfide, Wave.

For abstract, see S 04 16.

N66-29073 Field 9C
CFSTI Prices HC$3.00 MF$0.50
Fifth Dimension, Inc., Princeton, N. J.
PRE-PRODUCTION TEST PLAN, ELECTROMAGNETIC INTERFERENCE AND SUSCEPTABILITY TESTS, HIGH LEVEL MULTICODER, MODEL HDA4M-839.
1965, 71p NASA-CR-65409
Contract NAS9-4590

Descriptors: *Electromagnetic measurement, *Interference, *Susceptibility, *Test program, Coder, Electromagnetic, High, Instrumentation, Level, Measurement, Microminiaturization, Multicomponent, Program, Test.

For abstract, see S 04 16.

N66-29074 Field 9C
CFSTI Prices HC$3.00 MF$0.75
Fifth Dimension, Inc., Princeton, N. J.
ACCEPTANCE TEST PROCEDURE FOR FIFTH DIMENSION MULTICODER MODEL HDA4M-839.
by W. E. Newborn. 26 Sep 65, 71p NASA-CR-65410
Contract NAS9-4590

Descriptors: *Electric measurement, *Environmental testing, *Test program, Acceptance, Coder, Electric, Environment, Measurement, Microminiaturization, Multicomponent, Parameter, Procedure, Program, Test, Testing.

For abstract, see S 04 16.

N66-29080 Field 9C
CFSTI Prices HC$2.00 MF$0.50
Radio Corp. Of America, Harrison, N. J. Microwave Tube Operations Dept.
DEVELOPMENT OF A 1680-MEGACYCLE POWER OSCILLATOR FINAL REPORT, 22 MAY - 22 NOV. 1964.
by O. Johnk, and J. Mc ginty. 1964, 33p NASA-CR-66101
Contract NAS1-3859

Descriptors: *Electronic equipment, *Meteorological rocket, *Oscillator, *Sounding rocket, *Telemetry, Characteristics, Electric, Electronic, Equipment, Facility, Manufacturing, Meteorology, Power, Production, Rocket, Ruggedness, Sounding, Standard.

For abstract, see S 04 16.

N66-29216 Field 9C
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
OPTIMAL CONTROL OF SATURATING SYSTEMS WITH STOCHASTIC INPUTS.
by W. P. Kavanaugh, and E. C. Stewart. Jul 66, 25p NASA-TN-D-3479
Presented At The 3d Congr. Of Intern. Federation Of Autom. Control, London, Jun. 1966

Descriptors: *Nonlinear system, *Optimal control, *Random signal, *Saturation, *Stochastic process, Control, Input, Nonlinear, Optimal, Process, Random, Signal, Space vehicle, Stochastic, System, Theory.

For abstract, see S 04 16.

N66-29219 Field 9C
CFSTI Prices HC$4.00 MF$0.75
Hughes Aircraft Co., Culver City, Calif.
THE STUDY OF MULTIPACTOR BREAKDOWN IN SPACE ELECTRONIC SYSTEMS FINAL REPORT.
Jul 66, 119p NASA-CR-448
Contract NAS5-3916

Descriptors: *Electric discharge, *Multipactor, *Secondary emission, *Spacecraft electronic equipment, Cause, Condition, Discharge, Effect, Electric, Electron, Electronic, Emission, Equipment, High frequency, Radio, Resonance, Secondary, Spacecraft, Transmission, Transmitter.

For abstract, see S 04 16.

N66-29331 Field 9C
CFSTI Prices HC$3.00 MF$0.75
Bendix Corp., Davenport, Iowa. Pioneer-central Div.
DEVELOPMENT OF A PROTOTYPE LH2 CAPACITANCE TYPE MASS FLOWMETER AND READOUT SUMMARY REPORT.
by T. A. Loftus. 22 Feb 65, 63p NASA-CR-63521
Contract NAS8-5218
Its Publ. No. 3170-65

Descriptors: *Flow meter, *Liquid hydrogen, *Mass flow, *Readout, Capacitance, Design, Electronic, Error, Flow, Hydrogen, Liquid, Mass, Meter, Null, Sensor, Temperature, Transducer.

For abstract, see S 04 16.

N66-29353 Field 9C
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
AN ACTIVATION CRITERION FOR REPEATED USE OF AN OPTIMAL FIXED TIME CONSTANT ENERGY REGULATOR.
by P. S. Rempfer. 1965, 8p NASA-TM-X-56748
Presented At The 12th East Coast Conf. On Aerospace And Navigational Electron., Baltimore, 27-29 Oct. 1965

Descriptors: *Optimal control, *Regulator, *Time constant, Activation, Constant, Control, Criterion, Energy, Error, Feedback, Linear, Multiplier, Optimal, Plant, Time.

For abstract, see S 04 16.

N66-29478 Field 9C
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A WORST DISTURBANCE DESIGN CRITERION IN THE THEORY OF ANALYTICAL CONTROL SYSTEMS SYNTHESIS.
by T. E. Carter. 7 Jun 66, 33p NASA-TM-X-53473

Descriptors: *Disturbance theory, *Linear system, *Optimal control, Analysis, Bound, Control, Design, Disturbance, Feedback, Linear, Matrix, Optimal, Strategy, Synthesis, System, Theory, Variable.

For abstract, see S 04 16.

N66-29479 Field 9C
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STATUS REPORT ON PHYSICS BRANCH LOW CURRENT DETECTOR PROGRAM.
by H. Z. Reed. Oct 65, 38p NASA-TM-X-55496, X-623-65-391

Descriptors: *Detector, *Electrometer, *Electron multiplier, *Solid state device, *Switching circuit, Circuit, Component, Current, Device, Electric, Electron, Insulator, Low current, Measurement, Modulator, Multiplier, Resistor, Solid, State, Switching.

For abstract, see S 04 16.

N66-29759 Field 9C
CFSTI Prices HC$2.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge. Electronic Systems Lab.
THE DISCRETE MINIMUM PRINCIPLE WITH APPLICATION TO THE LINEAR REGULATOR PROBLEM.
by M. Athans, and D. L. Kleinman. Feb 66, 28p NASA-CR-76035, ESL-R-260
Grant NSG-496, Contract MIT PROJ. DSR-9952

Descriptors: *Difference equation, *Linear system, *Optimal control, Control, Difference, Discrete, Dynamic, Equation, Finite, Linear, Minimum, Optimal, Principle, Programming, System, Theory.

For abstract, see S 04 16.

N66-36260 **Field 9C**
CFSTI Prices HC$4.00 MF$0.75
Arizona Univ., Tucson. Engineering Research Labs.
CONTROL SYSTEM DESIGN BY STATE VARIABLE FEEDBACK TECHNIQUES ANNUAL STATUS REPORT, VOLUME I.
by D. G. Schultz. Jul 66, 102p NASA-CR-77901
Grant NSG-490

Descriptors: *Closed loop system, *Feedback control system, *Linear system, *Synthesis, Closed, Control, Design, Feedback, Linear, Loop, Method, Physical, Quantity, State, System, Variable.

For abstract, see S 04 21.

N66-36390 **Field 9C**
CFSTI Prices HC$1.00 MF$0.50
Virginia Univ., Charlottesville. Div. Of Mechanical Engineering.
ANALYSIS AND IMPROVEMENT OF ITERATION METHODS FOR SOLVING AUTOMATIC CONTROL EQUATIONS SEMIANNUAL STATUS REPORT, FEB. - AUG. 1966.
by J. W. Moore. Sep 66, 20p NASA-CR-77940, ME-4023-103-66U
Grant NSG-635

Descriptors: *Approximation method, *Automatic control, *Iterative solution, Approximation, Automatic, Control, Eigenvalue, Equation, Iteration, Matrix, Method, Polynomial, Root, Solution, Technique.

For abstract, see S 04 21.

PB-172 899 **Field 9C**
CFSTI Prices: HC$1.60 MF$0.50
Stanford Univ., Calif. Stanford Electronics Labs.
REALIZABILITY CONDITIONS FOR DISTRIBUTED RC NETWORKS.
Technical rept.,
by T. N. Rao, C. V. Shaffer, and R. W. Newcomb.
May 66, 11p TR-6558-7, SU-SEL-66-044
Grant NSF-GK-237

Descriptors: (*Networks, Theory), (*Circuits, Numerical analysis), Miniature electronic equipment, Integrated circuits, Electric connectors, Transformers, Transmission lines, Resistance (Electrical), Capacitance.

General theorems are stated presenting necessary and sufficient conditions for the existence of passive n-ports constructed from transformers and 'rationally related' uniform RC transmission lines. (Author)

PB-172 975 **Field 9C**
CFSTI Prices: HC$7.60 MF$0.75
Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
STEADY STATE ANALYSIS OF LINEAR NETWORKS CONTAINING A SINGLE SINUSOIDALLY VARYING ELEMENT,
by B. J. Leon, and J. V. Adams. 1965, 76p TR-EE66-4
Grant NSF-GK-26
Proj. PRF-4108

Descriptors: (*Networks, Numerical analysis), (*Circuits, Numerical analysis), (*Parametric amplifiers, Theory), Difference equations, Continued fractions, Oscillation, Integral equations, Differential equations.

A method is presented for determining the steady state solution for a class of time variant linear circuits containing a single sinusoidally varying element. Results are obtained by a frequency domain technique. The time invariant portion of the network is viewed as a Norton or Thevenin equivalent circuit in the time domain with the variable element connected as the load. Kirchoff's laws are applied to obtain an integro-differential equation of the convolution type. This equation is Laplace transformed to obtain a second order inhomogeneous difference equation. By the method of variation of parameters, the general solution to the inhomogeneous equation is obtained in terms of the homogeneous solutions. By manipulating ratios of the homogeneous solutions, the complete solution is determined in terms of two infinite continued fractions involving only immitance terms from the linear time invariant portion of the network. Suitable finite estimates for the infinite continued fractions are derived. Upper bounds for the errors involved are given. Numerical examples are included to illustrate the theory. (Author)

PB-173 133 **Field 9C, 14B**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
DISTORTION ANALYZERS 331A AND 332A (HEWLETT-PACKARD).
Technical manual instrument calibration procedure, AW-42.
1 May 66, 27p
NAVWEPS-17-20AW-42

Descriptors: (*Frequency analyzers, Calibration), Instruction manuals, Test methods, Test equipment (Electronics), Distortion, Signals.

The procedure describes the calibration of the Hewlett-Packard 331A and 332A distortion analyzers, which are designed to measure distortion on fundamental signals from 5Hz to 600 kHz.

PB-173 136 **Field 9C, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Co., Seattle, Wash. Aero-Space Div.
RANDOM-NOISE GENERATOR MODEL 1390-A (GENERAL RADIO CO.).
Technical manual instrument calibration procedure AG-83.
1 Jul 66, 10p
Contract N123 (62861)35056A
NAVAIR-17-20AG-83
This publication supersedes NAVWEPS 17-20AG-83 1 September 1965.

Descriptors: (*Noise generators, Calibration), Instruction manuals, Test methods, Test equipment (Electronics).

The procedure describes the calibration of the General Radio Co. 1390-A random-noise generator.

PB-173 137 **Field 9C, 14B**
CFSTI Prices: HC$1.00 MF$0.50
SSCO Standards Lab., Inc., Southfield, Mich.
RADA SWEEP GENERATOR KAY ELECTRIC 380A.
Technical manual instrument calibration procedure AG-91.
15 May 66, 13p
Contract N123 (62861)35059A
NAVAIR-17-20AG-91

Descriptors: (*Sweep generators, Calibration), Instruction manuals, Test methods, Test equipment (Electronics).

The procedure describes the calibration of the Kay Electric Model 380A, Rada Sweep Generator which is a wide band sweep oscillator with center frequencies at 30 and 60 Mc.

PB-173 143 **Field 9C, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
VOLTAGE STANDING WAVE RATIO MEASUREMENT OF ONE- AND TWO-PORT WAVEGUIDE COMPONENTS FREQUENCY RANGE: 2.6 to 40.0 GHZ.
Technical manual instrument calibration procedure, GV-08.
1 Aug 66, 22p
NAVAIR-17-20GV-08

Descriptors: (*Waveguides, Calibration), Instruction manuals, Standing wave ratio, Measurement, Test equipment (Electronics).

The procedure describes the measurement of the voltage standing wave ratio (VSWR) of one- and two-port waveguide components in the frequency range of 2.60 to 40.0 GHz as listed in table I. Appendix A contains a list of components which may be calibrated by this procedure, and the manufacturer's specified maximum acceptable VSWR.

PB-173 144 **Field 9C, 14**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
KELVIN BRIDGE LEEDS AND NORTHRUP 4287.
Technical instrument calibration procedure-AR-20.
15 Jul 66, 27p
NAVAIR-17-20AR-20

Descriptors: (*Electric bridges, Calibration), Instruction manuals, Test methods.

The procedure describes the calibration of the Leeds and Northrup 4287 Kelvin bridge.

PB-173 204 **Field 9C, 14**
CFSTI Prices: HC$3.00 MF$0.50
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
VOLT-OHM-MILLIAMETERS. AN/PSM-4, AN/PSM-4A, 4B, 4C, AN/PSM-6, ME-9/U, C/U, D/U, E/U, F/U, ME-185/USM-123, TS-352/U, A/U, B/U, TS-297/U (1), (2), (3), (4), SIMPSON 260 SERIES 1, 2, 3, 4, 4M, SIMPSON 269, TRIPLETT 630, TRIPLETT 630 PL, WESTON 980.
Technical manual instrument calibration procedure, VE-01.
1 Aug 66, 31p
NAVAIR-17-20VE-01

Descriptors: (*Multimeters, *Calibration), Voltmeters, Ohmmeters, Ammeters.

PB-173 251 **Field 9C, 14**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
ELECTRONIC COUNTER 5222B (HEWLETT-PACKARD).
Technical manual instrument calibration procedure, VF-01.
15 Sep 66, 9p
NAVAIR-17-20VF-01
PB-170 609 superseded.

Descriptors: (*Counting methods, Calibration), Instruction manuals, Test equipment (Electronics), Test methods, Electronic equipment.

The procedure describes the calibration of the Hewlett-Packard 522B electronic counter.

PB-173 262 **Field 9C, 14**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
OSCILLOSCOPE AN/USM-32 (OS-34/USM-32).
Technical manual instrument calibration procedure, VW-10.
1 Sep 66, 19p
NAVAIR-17-20VW-10
Supersedes - PB-170 854.

Descriptors: (*Oscilloscopes, Calibration), Instruction manuals, Test methods, Test equipment (Electronics).

The procedure describes the calibration of the OS-34/USM-32 oscilloscope.

PB-173 309 Field 9C, 14B
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
OSCILLOSCOPE OS-82/USM-105, OS-82A/USM-105A OS-120/USM-139, OS-129/ASM-35 HEWLETT-PACKARD 160A, 160B, 160BR HICKOK 1804, 1894A OR 1804R.
Technical manual instrument calibration procedure, VW-02.
15 Sep 66, 31p
NAVAIR-17-20VW-02
PB-170 887 superseded.

Descriptors: (*Oscilloscopes, *Calibration), Instruction manuals, Test methods, Test equipment (Electronics).

PB-173 337 Field 9C, 14B
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
OSCILLOSCOPES AN/USM-24, AN/USM-24A, AN/USM-24B, AN/USM-24C, AN/USM-24D.
Technical manual instrument calibration procedure, VW-09.
1 Oct 66, 21p
NAVAIR-17-20VW-09

Descriptors: (*Oscilloscopes, *Calibration), Instruction manuals.

Identifiers: AN/USM-24.

AD-639 704 See Field 12B

PB-173 134 See Field 13M

9D. INFORMATION THEORY

AD-470 834 Field 9D
CFSTI Prices: HC$1.60 MF$0.50
Northwestern Univ., Evanston, Ill. Technological Inst.
ONE-PASS ALGORITHMS FOR SOME GENERALIZED NETWORK PROBLEMS.
Systems research memo,
by Abraham Charnes, and William M. Paike. 11 Aug 65, 19p SRM-136
Contracts Nonr-1228 (01), DA-31-124-ARO (D)-322
Proj. NR-047 021

Descriptors: (*Networks, Linear programming), Communication theory, Mathematical models, Decision theory, Scheduling, Optimization, Topology, Management engineering, Operations research, Systems engineering.

The generalized network problem and the closely related restricted dyadic problem are two special model types which occur frequently in applications of linear programming. Although they are next in order after pure network or distribution problems with respect to ease of computation, the jump in degree of difficulty is such that, in the most general problem, there exist no algorithms for them comparable in speed or efficiency to those for pure network or distribution problems. There are, however, numerous examples in which some additional special structure leads one to anticipate the existence of algorithms which compare favorably with the efficiency of those for the corresponding pure cases. Also, these more special structures may be encountered as part of larger or more complicated models. In this paper topological properties designate two special structures which permit evolution of efficient algorithms. These follow by extensions of methods of Charnes and Cooper and of Dijkstra for the corresponding pure network problems. Easily implemented algorithms are obtained which provide an optimum in one 'pass' through the network. The proofs provided for these extended theorems differ in character from those provided (or not provided) in the more special 'pure' problem algorithms published.

AD-640 030 Field 9D, 17B
CFSTI Prices: HC$1.00 MF$0.50
Naval Submarine Medical Center, Groton, Conn.
COPYING NOISY RADIO CODE MESSAGES.
Memorandum rept.,
by Paul F. Smith. 21 Dec 64, 7p MR-64-5
NAVMED-MR005.14-1001-2.17

Descriptors: (*Coding, *Radio transmission), (*Signal-to-noise ratio, Coding), Information theory, Radio signals.

The problem was to determine the ability of radiomen to copy radio code at various signal-to-noise ratios. It was found that code copying performance deteriorates as the signal-to-noise ratio becomes small. This information will be of use in determining figures of merit for communication systems employing radio code and human transcribers, and for comparing the overall performance of such systems with fully automated systems.

AD-640 398 Field 9D
CFSTI Prices: HC$5.00 MF$1.00
Northeastern Univ., Boston, Mass.
ON LINEAR PRODUCT CODES AND THEIR DUALS,
by Lih-Jyh Weng. Jun 66, 178p Scientific-4
Contract AF 19 (628)-3312, Grant NGR-22-011-013
Proj. AF-4610
Task 461003
AFCRL-66-471

Descriptors: (*Coding, *Tensor analysis), (*Matrix algebra, Coding), Permutations, Decoding.

Identifiers: Tensor product.

The value of studying the tensor product of linear codes is demonstrated. The pertinent problems concerning these product codes are outlined. Algebraic techniques for determining the null space of a tensor product space are developed. The understanding of the null space of a product space is useful not only in the development of this report, but also for future research work. Decomposition of the procedure and implementation of encoding and decoding of a product code into those of its component codes are shown. In the case where the component codes are cyclic, the product code has the special feature that its encoder and syndrome calculator can be easily converted to those of its dual codes by programmed switching. A simple decoding scheme; namely, permutation decoding, which is capable of correcting a large fraction of all the correctable errors of a systematic cyclic code, is investigated. It is suggested that it be used either as a part of the correction-detection scheme or in combination with an auxiliary scheme to attain full error correction capability. Finally, the minimum distances of product codes, and suitable communication channels for employing such codes, are discussed. (Author)

AD-640 403 Field 9D, 17B
CFSTI Prices: HC$4.00 MF$0.75
New York Univ., N. Y. Lab. for Electroscience Research.
QUEUEING AND INTERFERENCE AMONG MESSAGES IN A COMMUNICATION SYSTEM WITH TRANSMISSION DELAY.
Technical rept.,
by Paul T. Brady. Jun 66, 113p TR-400-134
Grant AF-AFOSR-24-66
Proj. AF-9769
Task 976902
AFOSR-66-2049

Descriptors: (*Information theory, *Queueing theory), Space communication systems, Data transmission systems, Interference.

Identifiers: Theses.

This thesis describes a technique for analyzing the statistical behavior of a two-way communication system with transmission delay (D). The transmit/receive devices, or servers, at the terminals are constructed so that they cannot transmit and receive simultaneously. Each server is therefore designed not to interrupt reception of a message with its own transmission. If $D > 0$, each server is uncertain of the present state of the other, and may initiate transmission when the other has already begun to transmit, thus causing message interference. Interference is measured as the amount of one server's transmission which arrives at the other server when it is already transmitting. The relationship between the size of the delay and the amount of interference is studied here, as well as other quantities that describe the system behavior. The exact solution is available only for $D = 0$, but an approximate solution is found for D very small with respect to the lengths of idle periods of the servers, and the asymptotic solution is obtainable for D very long. Good agreement is found between theoretical results and those obtained from simulation. Theoretical results have been obtained for a variety of systems fitting the two-way communication model proposed here, but there are certain important cases for which the only results yet available are from simulation. (Author)

N66-29381 Field 9D
CFSTI Prices HC$1.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge. Research Lab. Of Electronics.
OPTIMUM LINEAR FILTERING OF AN INTEGRATED SIGNAL IN WHITE NOISE.
by D. L. Snyder. 1965, 5p NASA-CR-67853
Grants NSG-334, NSG-496
Submitted For Publication

Descriptors: *Linear filter, *Signal noise, *White noise, Analog, Calculation, Delay, Equation, Error, Filter, Integrator, Linear, Mean, Message, Noise, Problem, Signal, Solution, Square, White.

For abstract, see S 04 16.

N66-29511 Field 9D
CFSTI Prices HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
FILTERING TECHNIQUES FOR NOISE SUPPRESSION IN QUASI-BALANCED CIRCUITS.
by W. R. Johnson. 15 Jun 66, 25p NASA-CR-75930, JPL-TR-32-945
Contract NAS7-100

Descriptors: *Electronics, *Filter, *Noise reduction, Circuit, Electric, Isolation, Noise, Power, Reduction, Signal, Suppression, Transformer, Voltage.

For abstract, see S 04 16.

N66-35777 Field 9D
CFSTI Prices HC$2.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge. Instrumentation Lab.
INFORMATION PROCESSING AND DATA COMPRESSION FOR EXOBIOLOGY MISSIONS STATUS REPORT, OCT. 1965 - MAR. 1966.
by L. L. Sutro. Jun 66, 41p NASA-CR-77564, R-545, REV.
Contract NSR-05-020-010
Presented At The 12th Ann. Meeting Of The Am. Astronautical Soc., Anaheim, Calif., 23-25 May 1966 Revised

Descriptors: *Automaton, *Control system, *Decision making, *Explorer xviii satellite, *Stereoscopic vision, Animal, Communication, Control, Data, Decision, Explorer satellite, Frog, Handling, Instrumentation, Interplanetary, Mars, Mission, Model, Processor, Robot, Stereoscopy, System, Vision.

For abstract, see S 04 21.

AD-639 803 See Field 9C

AD-640 020 See Field 12A

AD-640 028 See Field 17B

AD-640 294 See Field 9B

PB-173 020 See Field 17I

9E. SUBSYSTEMS

AD-463 202 **Field 9E**
CFSTI Price: HC$2.00
Royal Aircraft Establishment, Farnborough (England).
A REVIEW OF SOME FIELD-EFFECT AND METAL-BASE SOLID-STATE AMPLIFIERS.
Technical rept.,
by C. Fromberg. Dec 65, 47p TR-64088

Descriptors: (*Transistors, *Semiconducting films), (*Transistor amplifiers, Semiconducting films), Gain, Bandwidth, Electric insulation, Electric currents, Voltage, Space charges, Electric fields, Injection, Metal films, Great Britain.

A number of recently developed three terminal devices are described and compared, particularly with regard to their gain bandwidth product and their potential use in thin-film circuits. (Author)

AD-479 052 **Field 9E**
CFSTI Prices: HC$7.60 MF$0.75
Columbia Univ., New York. Electronics Research Labs.
ELECTRO-OPTICAL SIGNAL PROCESSING TECHNIQUES FOR PHASED ARRAY ANTENNAS.
Quarterly progress rept.
1 Jan 66, 73p P-5/321, CU-22-66-AF-1478-ERL
Contracts AF 49 (638)-1478, ARPA Order-279
See also AD-613 662 and AD-624 132.

Descriptors: (*Phased arrays, *Data processing systems), Mathematical analysis, Electrooptics, Antenna lobes, Reduction, Multiplex, Optical equipment, Lenses, Light, Modulators, Ultrasonic radiation, Mechanical waves, Aspherical lenses, Refractive index, Silicon compounds, Dioxides, Solids, Refraction, Spectra (Visible + ultraviolet), Light transmission, Theory.

The investigation of phased array antenna electrooptical signal processors is continued. The experimental results for side-lobe suppression in the time-delay multiplex mode are presented. A side-lobe suppression of 30 db for both signals on and off the boresight axis is demonstrated. A comparison of the optical system response with the input signal spectrum indicates that the results are very nearly ideal and limited primarily by the residual phase errors in the optical lenses. Preliminary test results for the new aspheric lenses are included. The experimental program for the investigation and development of a solid ultrasonic light modulator is described. The experimental configurations for a fused silica light modulator operating at 100 mHz for various transducers is presented. A brief derivation of the elasto-optic theory for solids and a discussion of modulation index, internal refraction effects, and attenuation in fused silica are included. (Author)

AD-479 419 **Field 9E**
CFSTI Prices: HC$3.00 MF$0.75
Royal Radar Establishment, Malvern (England).
TUNABLE ACTIVE LADDER FILTERS USING OPERATIONAL AMPLIFIERS,
by R. L. Ford, F. E. J. Girling, and E. F. Good.
Oct 65, 79p Technical note TN-711

Descriptors: (*Electric filters, Active), (*Low-pass filters, Active), (*High-pass filters, Active), (*Band-pass filters, Active), Integrated circuits, Amplifiers, Integrators, Great Britain, Feedback, Gain, Resistance (Electrical), Frequency, Response, Mechanical drawings.

A form of active filter is described in which electronic integrators replace the reactive elements in the equivalent passive ladder networks. Some additional amplifiers are required in order to obtain the correct sign relationships between the various feedback and feedforward connections, but the filters may be m-derived (i.e. zeroes are introduced in the stop band to give a steeper cut off) simply by introducing additional interconnections. The apparent extravagance in the use of operational amplifiers is offset by the recent appearance of relatively cheap integrated circuits, and the fact that the filters may be tuned continuously over, say, a 10:1 frequency range by means of a simple switching technique. An unusual advantage of the method of realisation is that existing design data for passive filters may be used directly. Methods of compensating for finite amplifier gain and input resistance are described although this is not expected to be necessary in most practical cases. Design data for a range of one and two-section symmetrical Darlington filters and for Butterworth filters is given and also the frequency responses of some resistor-terminated constant-k filters. (Author)

AD-639 667 **Field 9E, 20L**
CFSTI Prices: HC$3.00 MF$0.75
Westinghouse Research Labs., Pittsburgh, Pa.
TUNED INTEGRATED CIRCUITS.
Quarterly rept. no. 1, 1 Apr-1 Jul 66,
by W. E. Newell, S. M. Zalar, and B. R. McAvoy.
Sep 66, 72p 66-9F1-NEWSC-R1
Contract DA-28-043-AMC-02045 (E)
Proj. DA-1E6-22001-A-440
Task 03
ECOM-02045-1

Descriptors: (*Tuning devices, *Integrated circuits), Semiconductor devices, Microminiaturization (Electronics), Cadmium compounds, Sulfides, Piezoelectric crystals.

The purpose of the contract is to investigate tuning devices and physical phenomena which could lead to stable frequency selective silicon integrated circuits over the range from 150 kHz to 150 MHz. This first quarterly report includes the description of the method for producing stoichiometric, well-oriented and insulating thick films of CdS by vacuum co-evaporation, discusses the structural hexagonality of the produced CdS films and describes the experimental analysis of piezoelectric resonances.

AD-639 715 **Field 9E, 20I**
CFSTI Prices: HC$3.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J.
PLASMA GENERATORS FOR MICROWAVE DEVICES.
Final rept.,
by Maurice Weiner, Robert M. True, and Edward V. Edwards. Aug 66, 52p ECOM-2740
Proj. 1L0-13001-A-91A
Task 1L0-13001-A-91A-26-00

Descriptors: (*Plasma generators, *Microwave equipment), Langmuir probes, Experimental data, Ion sources, Synthesis.

An experimental study has been undertaken to determine methods for producing a high-density plasma suitable for microwave applications. The Penning Ionization Gauge (PIG) discharge and lithium ion emission for plasma synthesis have been investigated. Langmuir probe measurements on the PIG were obtained under various conditions of anode current, magnetic field, gas pressure, and probe position. Radial and longitudinal profiles of electron density, electron temperature, and plasma potential were obtained. The lithium ion emission studies indicate the need for greater ion current densities than those presently achieved. (Author)

AD-639 809 **Field 9E, 20N, 1**
Not available from CFSTI.
Boeing Co., Seattle, Wash. Aerospace Group.
EXPERIMENTAL RESULTS OF VLF DIPOL TESTS ON THE GREENLAND ICE CAP.
Revised ed.,
by T. L. Johnson, and G. M. R. Winkler. 21 Mar 66, 8p
Revision of manuscript submitted 13 Sep 65.
Availability: Published in Radio Science v1 (ne series) n8 p1003-10 Aug 1966.

Descriptors: (*Dipole antennas, Very lo frequency), (*Ice, Dielectric properties), Ele trical impedance, Electric wire, Electric c bles, Electrical properties, Electric insulatio Electric currents, Snow, Greenland, Expe mental data, Performance (Engineering).

Results of measurements on long resonant dipole installed on the Greenland ice cap are presente The difficulties involved in laboratory modelin of VLF antennas are discussed and the full-scal data presented show significant differences fro previously reported model data. Self-impedanc amplitude current distributions, and relative eff ciency were measured using dipoles that range in length from 600 m to 8.000 m. Results fro three 3.700-m dipoles having different insulatio diameters are compared. Four-electrode measure ments of complex conductivity of the surface ic are also reported. Dipole driving point resistanc at resonance is found to be higher than expecte and a basic correlation of resonant length and dri ing point resistance with the dielectric propertie of the ice is noted. The efficiency of insulated d poles was found to be significantly greater tha that of uninsulated dipoles of equivalent length (Author)

AD-639 995 **Field 9**
CFSTI Prices: HC$2.00 MF$0.50
Republic Aviation Corp., Farmingdale, N. Y. Electronic Product Requirements.
CORWOOD MODULE EVALUATION AN RELIABILITY PROGRAM.
Final rept.
22 Sep 64, 39p RAC-2472-Rev-A, EPD-564-96
Contract DA-36-039-sc-90909
See also AD-618 387.

Descriptors: (*Modules (Electronics), *Relia bility (Electronics)), Life expectancy, Failur (Electronics), Relaxation oscillators, Inver ters, Encapsulation, Soldered joints, Stresses Analysis of variance.

Identifiers: Cordwood modules.

Three facts emerge as the most significant result of the overall module evaluation program: (1) I was conclusively demonstrated that the RAC Cordwood Module packaging technique does no degrade the reliability of electronic piece parts i a time-temperature environment, and increase the reliability of these parts in a shock and/or vi bration environment, compared to the reliabilit of the same parts in a free-air mounting. (2) It ap pears that there is an optimum time-temperatur conditioning cycle that will maximize the resis tance of the modules to a thermal stress. (3) It was shown that the results of stress-strength testing correlate to a high degree with those of life testing The operational life test showed that the inverte modules had a MTBF five times greater than tha of the flip-flop modules. Under stress-strength testing, the inverter modules proved to be more resistant to thermal stress, more uniform in their strength characteristic, and to have a more stable strength characteristic than the flip-flop modules.

AD-640 009 **Field 9**
CFSTI Prices: HC$3.00 MF$0.75
Ballistic Research Labs., Aberdeen Proving Ground, Md.
THE VARR METHOD: A TECHNIQUE FOR DETERMINING THE EFFECTIVE POWER PATTERNS OF MILLIMETER-WAVE RADIOMETRIC ANTENNAS,

by R. B. Patton Jr. and C. L. Wilson. May 66, 68p
BRL-1322
Proj. RDT/E-1P523801A286

Descriptors: (*Antennas, Radiometers), (*Radiofrequency power, Antenna radiation patterns), Measurement, Test methods, Gain, ture.

The VARR (VAriable Range Reflector) Method is a technique which has been developed to measure the effective power patterns of millimeter-wave radiometric antennas. In this method, a large movable metallic surface is oriented to reflect radiation from the zenith into an antenna which is directed along the horizontal. Radiometric temperature is measured as a function of the range of the reflector from the antenna. In addition, the water vapor content of the atmosphere and the radiometric temperatures in the directions of background and zenith are observed. A computing procedure has been devised to determine the complete pattern and gain characteristics of the antenna system purely on the basis of data provided by the measuring system. The method has been used to successfully determine the effective power patterns of a number of antenna systems. These results form the basis of a comparative evaluation of antenna system performance that is in substantial agreement with the observed effectiveness of these same antennas in previous measurements. (Author)

AD-640 063 **Field 9E**
CFSTI Prices: HC$2.00 MF$0.50
Sylvania Electronic Systems-East, Waltham, Mass. Applied Research Lab.
IMPEDANCE OF FINITE INSULATED CYLINDRICAL ANTENNA IN A COLD PLASMA WITH A LONGITUDINAL MAGNETIC FIELD,
by J. Galejs. 25 Jul 66, 40p Scientific-2, RR-491
Contract AF 19 (628)-5718
Proj. AF-4642
Task 464202
AFCRL-66-551

Descriptors: (*Antennas, Electrical impedance), Cylindrical bodies, Electric insulation, Plasma medium, Magnetic fields, Ionosphere, Dielectric films.

A variational formulation is developed for the impedance of a finite cylindrical antenna embedded in a dielectric cylinder, which is surrounded by a magnetoionic medium (cold electron plasma) with the static magnetic field impressed in a direction parallel to the antenna axis. Closed form expressions are obtained in the limit of low frequencies, and for short antennas in a uniaxial medium. The impedance of a short antenna is nearly the same as for an assumed triangular current distribution, except that further resonances are observed in the vicinity of the gyro frequency, where the antenna becomes electrically long. These resonances may be shifted to frequencies exceeding the gyro frequency in the presence of an insulating layer around the antenna. For very thin insulating layers the wave number of the variationally approximated current distribution is to the first order equal to square root of epsilon sub 1 k sub o (epsilon sub 1 is the leading diagonal element of the permittivity matrix), where the gyro frequency may be both smaller or larger than the plasma frequency. However this approximation does not apply to current distributions along the insulated antenna. The present calculations are also compared with earlier work on antenna impedances. (Author)

AD-640 065 **Field 9E, 20I**
CFSTI Prices: HC$2.00 MF$0.50
Sylvania Electronic Systems-East, Waltham, Mass. Applied Research Lab.
IMPEDANCE OF A FINITE INSULATED ANTENNA IN A COLD PLASMA WITH A PERPENDICULAR MAGNETIC FIELD,
by J. Galejs. 25 Jul 66, 36p Scientific-4
Contract AF 19 (628)-5718
Proj. AF-4642
Task 464202
AFCRL-66-553

Descriptors: (*Antennas, Electrical impedance), Plasma medium, Magnetic fields, Dielectrics, Frequency, Embedding substances.

A variational formulation is developed for the impedance of a finite strip antenna embedded in a planar dielectric slab which is surrounded by a magnetoionic medium (cold electron plasma) with a static magnetic field impressed in a direction perpendicular to the antenna surface. Closed form expressions are obtained in the limit of low frequencies, and for a short antenna in a uniaxial medium. The impedance becomes large at the plasma frequency, near the upper hybrid resonance frequency and further resonances are observed near the gyro-frequency if the gyro-frequency exceeds the plasma frequency. The reactance of a short antenna is inductive at low frequencies, but becomes capacitive as the thickness of the insulation around the antenna is increased. (Author)

AD-640 066 **Field 9E, 20I**
CFSTI Prices: HC$2.00 MF$0.50
Sylvania Electronic Systems-East, Waltham, Mass. Applied Research Lab.
IMPEDANCE OF AN INSULATED LINEAR ANTENNA FOR LAYERS OF COMPRESSIBLE PLASMA,
by J. Galejs. 25 Jul 66, 31p Scientific-5
Contract AF 19 (628)-5718
Proj. AF-4642
Task 464202
AFCRL-66-554

Descriptors: (*Antennas, Electrical impedance), (*Plasma sheath, Electric insulation), Compressive properties, Dielectrics.

A flat strip antenna is embedded in a planar dielectric slab, which is surrounded on both sides by layers of compressible isotropic electron plasma. Several closed form expressions are obtained for the impedance with a sinusoidal current distribution along the antenna. The antenna impedance is computed numerically when considering the perturbations of the antenna current by surface waves. Except for thin plasma layers, the antenna impedance can be computed using the same current distribution as for a cold plasma. This supports the validity of earlier work which neglects the perturbation of the antenna current by plasma waves. However, it is essential to consider the finite transverse dimension of the antenna and the presence of an insulating layer or of an ion sheath. (Author)

AD-640 078 **Field 9E**
CFSTI Prices: HC$3.00 MF$0.75
Utah Univ., Salt Lake City. Upper Air Research Labs.
IMPEDANCE MEASUREMENTS OF UNBALANCED ROCKET ANTENNAS NEAR THE EARTH'S SURFACE.
by R. K. Linford, and K. D. Baker. Aug 66, 75p
Scientific-1, UU-66-10
Contract AF 19 (628)-5044
Proj. AF-7663
Task 766307
AFCRL-66-658

Descriptors: (*Rocket antennas, Electrical impedance), Measurement, Probes, Altitude, Sounding rockets.

An investigation was conducted to explore the possibility of accurately determining the free space impedance of a single, unbalanced, whip antenna mounted on a rocket. A system was developed to measure the impedance without any external electrical connection to the rocket. A method of suspending the rocket model was developed so that an error of less than 2 ohms was introduced into the impedance of the electrically short antenna by surrounding objects including the earth. The effects of frequency and geometry of the rocket-antenna system on the minimum height at which the rocket can be supported above the ground for accurate measurements were investigated. It was found that for antennas between 2 and 6 meters, rocket diameters between 0.2 and 0.5 meters, and frequencies between 10 and 12 Mhz, that a support height of 2.5 meters for the rocket model was sufficient for accurate measurements. (Author)

AD-640 417 **Field 9E, 20I**
CFSTI Prices: HC$2.00 MF$0.50
Microwave Electronics Corp., Palo Alto, Calif.
STUDY OF MICROWAVE GENERATION UTILIZING DOUBLE-STREAM INSTABILITIES IN ANISOTHROPIC MEDIA.
Quarterly progress rept. no. 9, 1 Jan-31 Mar 66,
by L. D. Buchmiller, and S. Kakihana. Oct 66, 41p
Contract DA-36-039-AMC-03424 (E)
Proj. DA-1G6-22001-A-055-04
ECOM-03424-9
See also AD-447 400.

Descriptors: (*Microwave amplifiers, *Plasma oscillations), (*Pyrolytic graphite, Plasma oscillations), (*Bismuth, Plasma oscillations), Band theory of solids, Anisotropy, Stability, Radiofrequency power, Magnetic properties, Propagation, Cryogenics.

The computer results for the two-stream instability in pyrolytic graphite (PG) and bismuth (Bi) have been obtained. The instability frequency for the acoustical mode in the optimum crystalline direction (trigonal) is approximately 500 GHz (wavelength = 0.6 mm) at the frequency of maximum growth rate. The current density required at the threshold of the instability is approximately 15 amp/sq mil. For PG, the corresponding frequency and current density requirement in the a-plane is 3 x 13 to the 13th power cps (wavelength = 10 microns) and 35 amp/sq mil. Experiments with PG samples of larger cross-sectional area have been unsuccessful even though the detection system sensitivity has been improved. Further experiments will be concentrated in Bi using an indium antimonide submillimeter detector operating at liquid helium temperature. (Author)

AD-640 453 **Field 9E, 9A**
CFSTI Prices: HC$1.00 MF$0.50
Defense Systems Lab., Syracuse Univ. Research Corp., N. Y.
SEMI-ANNUAL PROGRESS REPORT, 1 JANUARY 1966 TO 30 JUNE 1966,
by Gordon H. LaTourette. 15 Jul 66, 10p DSL-R-150
Contract N00014-66-C0111
Proj. NR-259-052

Descriptors: (*Antenna configurations, Direction finding), (*Transistors, Tests), Design, Antennas, Portable.

Servo Corporation of America has started work under sub-contract. To date, the project has been staffed and a field test site has been prepared. Several antenna configurations are being considered. Field effect transistors are being evaluated for use in the switching program. (Author)

AD-640 457 **Field 9E, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana. Coordinated Science Lab.
MATRIX SWITCHES AND ERROR CORRECTING CODES FROM BLOCK DESIGNS,
by Lalit Rai Bahl. Aug 66, 48p R-314
Contract DA-28-043-AMC-00073 (E), Grant NSF-GK-690
Proj. DA-20014501B31F

Descriptors: (*Switching circuits, *Magnetic core storage), Errors, Computers, Coding, Design, Matrix algebra, Corrections, Combinatorial analysis.

Methods of obtaining matrix switches from block designs were formulated by Singleton and Neu-

mann. The first part of the report extends Singleton's method for designing unipolar switches to the design of bipolar switches. A new class of low noise switches is obtained by permutation of the winding matrix of noiseless switches and it is shown how these new switches are related to block designs. The latter part of the report is concerned with methods of obtaining error detecting and error correcting codes from block designs. Some of these codes are found to be optimal. (Author)

AD-640 462 **Field 9E, 9B**
CFSTI Prices: HC$3.00 MF$0.50
Illinois Univ., Urbana. Coordinated Science Lab.
THE SELECTION OF FAILURE LOCATION TESTS BY PATH SENSITIZING TECHNIQUES,
by David R. Howarter. Aug 66, 58p R-316
Contract DA-28-043-AMC-00073 (E), Grant NSF-GK-36
Proj. DA-20014501B31F

Descriptors: (*Switching circuits, Tests), Failure (Electronics), Computer storage devices, Computer logic, Determination, Selection.

A method of deriving test sequences that utilizes path sensitizing techniques is presented. The tests are designed to locate (diagnose) faults in combinational logic networks. The basic strategy is to pick a fault to be tested and sensitize paths, some of which go through the fault. A path is sensitized if the associated test checks for faults along the path; therefore the main objective is to find a set of tests which will determine if the fault has occurred. The proposed method of test selection is compared to other techniques in current use and is shown to produce at least as good a set of tests as the others give even though the path sensitizing method uses less time or less computer memory space. (Author)

AD-640 490 **Field 9E**
CFSTI Prices: HC$3.00 MF$0.50
Navy Electronics Lab., San Diego, Calif.
LOW-FREQUENCY TOP-LOADED ANTENNAS.
Research and development rept., Nov 64-May 65,
by T. E. Devaney, R. F. Hall, and W. E. Gustafson. 22 Jun 66, 55p Rept. no. 1381
Proj. SF-006-03-05
Task 7916

Descriptors: (*Antennas, Low frequency), Electrical properties, Graphics, Design, Antenna masts.

Electrical properties of top-loaded monopole antennas and changes in these properties with top-hat configuration are analyzed and interpreted. It is recommended that the top-loaded monopole be accepted as the Navy standard for low-frequency use. Curves suitable for use in design are presented. (Author)

N66-36048 **Field 9E**
CFSTI Prices HC$1.00 MF$0.50
Alabama Univ., University. Bureau Of Engineering Research.
STUDY OF THE STABILITY OF THE S-IC OPEN LOOP PROPELLANT-HYDRAULIC SYSTEM QUARTERLY REPORT NO. 7.
27 Jun 66, 17p NASA-CR-77881
Contract NAS8-11341

Descriptors: *Hydraulic system, *Saturn s-ic stage, *Servo loop, Approach, F-1 rocket engine, Failure, Geometry, High pressure, Hydraulic, Link, Loop, Mechanical, Open, Propellant, Servoactuator, Stability, Structural, Surge, System.

For abstract, see S 04 21.

AD-639 744 **See Field 20C**

AD-639 745 **See Field 20C**

AD-639 908 **See Field 20C**

AD-639 952 **See Field 20J**

AD-640 239 **See Field 9A**

AD-640 430 **See Field 9C**

PB-170 808 **See Field 17A**

9F. TELEMETRY

AD-464 398 **Field 9F, 9B**
CFSTI Price: HC$2.60
Royal Aircraft Establishment, Farnborough (England).
BRAMBLE-AN AUTOMATIC PROCESSING SYSTEM FOR TELEMETRY DATA.
Technical rept.,
by E. S. Mallett, R. E. Perkins, and H. W. P. Knapp. Mar 65, 28p TR-65053

Descriptors: (*Data processing systems, Telemetering data), (*Telemeter systems, Great Britain), (*Special purpose computers, Telemetering data), Magnetic tape, Design, Multiplex, Punched cards, Input-output devices.

The processing of the large quantities of data associated with aircraft and missile trials can be eased by using automatic methods. An equipment is described which processes telemetry data recorded on magnetic tape giving a graphical record and digital outputs suitable for input to electronic computors. (Author)

AD-639 787 **Field 9F**
CFSTI Prices: HC$6.00 MF$1.25
Western Development Labs., Philco Corp., Palo Alto, Calif.
DEMODULATION OF ANGLE-MODULATED TELEMETRY SIGNALS. VOLUME I. ADVANCED DEMODULATION TECHNIQUES.
Rept. for 1 Aug-31 Jul 66,
by D. C. Luby, W. J. Gill, E. J. Ballard, and J. J. Spilker Jr. Aug 66, 250p WDL-TM-101
Contract AF 19(628)-5203
ESD-TR-66-408-Vol-I
See also AD-639 788.

Descriptors: (*Telemeter systems, *Demodulation), Phase-locked systems, Phase detectors, Demodulators, Signals, Distortion, Filters (Electromagnetic wave), Noise (Radio), Feedback.

A great deal of study has been given to the demodulation of FM and PM modulated signals. This report is the first of a two-volume series which reviews and contributes to the body of information on this subject. In this volume, three new techniques are discussed which are useful for the demodulation of angle-modulated signals. The three techniques analyzed are: (1) nonlinear post-detection filtering, (2) subharmonic phase-locked loop, and (3) feedforward deviation compression demodulator. The performance of these techniques is analyzed both with respect to noise effects and distortion. Emphasis is given to telemetry signal processing. Several computer (digital) programs were generated to carry out these investigations and nonlinear post-detection filters were simulated on an analog computer. In addition to the three new techniques studied in this report, several other topics are treated. One important topic is a precise analysis of the distortion in phase-locked loops. The second is a review of the effects of predetection recording on telemetry signals. (Author)

AD-639 788 **Field 9F**
CFSTI Prices: HC$6.00 MF$1.50
Western Development Labs., Philco Corp., Palo Alto, Calif.
DEMODULATION OF ANGLE-MODULATED TELEMETRY SIGNALS. VOLUME II. REVIEW OF DEMODULATION METHODS,
by J. J. Spilker Jr. and W. J. Gill. Aug 66, 283p WDL-TM-100
Contract AF 19(628)-5203

Descriptors: (*Telemeter systems, *Demodulation), Digital systems, Modulation, Phase-locked systems, Feedback, Discriminators, Signals, Frequency modulation, Distortion, Noise (Radio), Errors.

The report presents a review of the various methods available for the demodulation of the angle-modulated sinusoids. Three major sections are contained in this report: Demodulation of Analog Angle-Modulated Signals (Conventional FM Discriminators) (Phase-Locked Demodulators), Special Feedback and Feedforward Demodulators for Analog Modulated Signals, and Digital Signalling. In Section 2 conventional discriminator detection is discussed along with various forms of phase-locked demodulation. These areas have received the greatest attention in the literature and consequently are given the greatest space in this report. Section 3 describes a wide variety of special feedback and feedforward demodulation methods for angle-modulated signals. The frequency-feedback demodulator is considered here along with the numerous forms of 'modified' phase-locked loops. Feedforward demodulation methods are also discussed. Nonlinear post-detection filtering, described in greater detail in Vol. I (AD-639 787), is reviewed here for completeness. Various binary and M-ary methods of digital signalling are reviewed in Section 4. Optimum and near-optimum detection methods are described for: PCM-FM, FSK, PSK, DPSK, MPSK, M-ary coded PSK, and MFSK. (Author)

AD-640 447 **Field 9F, 9B**
CFSTI Prices: HC$6.00 MF$1.25
Sichak Associates, Nutley, N. J.
TELEMETRY TAPE COMBINER SYSTEM.
Final rept., Oct 62-May 66,
by Berl W. Martin, R. E. Ferguson, G. H. Schulze, Jack Harvey, and R. T. Adams. May 66, 207p
Contract AF 08 (606)-5739
Task 893883
ETR-TR-66-5

Descriptors: (*Magnetic recording systems, *Telemetering data), Telemeter systems, Magnetic tape, Delay lines, Data processing systems.

The report covers the study, investigation and experimentation performed in Phases I and II of the Telemetry Tape Combiner program. The objective of the contract (Phases I and II) was a breadboard demonstration of suitable techniques for optimally combining several telemetry tape recordings into one. The important problem areas in the development had to do with slaving together the separately recorded wideband signals with sufficient accuracy and speed of response to maintain coherent addition despite rapidly fluctuating errors in relative timing. Most of the effort in Phase I was devoted to the fundamental problem of time delay correction. Four different solutions (2 digital, 2 analog) were investigated and compared, with preference being given to a system of binary switching of fixed delay lines for further development in Phase II. A portable tape recorder test set was developed and used to obtain experimental values of time delay errors introduced by typical tape machines at the Air Force Eastern Test Range. For Phase II an 800 microsecond 1.5 mc bandwidth variable delay line was constructed and a two-reproducer predetection tape combiner breadboard was assembled. The delay line range, speed of response and bandwidth were adequate. The delay line initially used an amplitude modulated carrier and excessive transient noise was produced. When the delay line was rebuilt using an FM carrier system satisfactory performance was achieved. Various test signals were successfully combined. A recommended plan for an operational combiner is presented. (Author)

N66-28030 **Field 9F**
CFSTI Prices HC$3.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.

INSTRUMENTATION AND FLIGHT REPORT FOR AEROBEE 150 FLIGHTS 4.122 CG AND 4.123 CG.
by W. D. Fortney. Jul 65, 52p NASA-TM-X-55493, X-671-65-233

Descriptors: *Aerobee rocket, *Astrophysics, *Instrumentation, *Telemetry, *X-ray, Data, Experiment, Flight, Flux, Function, Level, Payload, Performance.

For abstract, see S 04 15.

N66-28513 **Field 9F**
CFSTI Prices HC$3.00 MF$0.75
Massachusetts Inst. Of Tech., Cambridge. Research Lab. Of Electronics.
AN EXPERIMENTAL FACILITY FOR SEQUENTIAL DECODING TECHNICAL REPORT NO. 450.
by C. W. Niessen. 13 Sep 65, 82p NASA-CR-75566, ESD-TDR-65-442
Grants NSG 334, NSG-496
Lincoln Lab. Tech. Rept. No. 396

Descriptors: *Communication theory, *Decoding, *Systems design, Algorithm, Analog, Communication, Computer, Design, Digital, Display, Fortran, Information, Interaction, Machine, Man, Mathematics, Noise, Recorder, Sequence, Statistical, System, Tape, Theory.

For abstract, see S 04 16.

N66-29071 **Field 9F**
CFSTI Prices HC$2.00 MF$0.50
Associated Testing Labs., Inc., Wayne, N. J. Fifth Dimension, Inc., Princeton, N. J.
REPORT OF TEST ON MULTICODER ENVIRONMENTAL TESTS.
by J. Mc gall. 21 Jan 66, 48p NASA-CR-65406, K1178-6396
Contract NAS9-4590
Prepared For Fifth Dimension, Inc.

Descriptors: *Electric measurement, *Environmental testing, *Test program, Analysis, Coder, Electric, Environment, Failure, Humidity, Measurement, Microminiaturization, Multicomponent, Program, Test, Testing.

For abstract, see S 04 16.

N66-29072 **Field 9F**
CFSTI Prices HC$3.00 MF$0.75
Fifth Dimension, Inc., Princeton, N. J.
REPORT OF RADIO INTERFERENCE TEST ON FIFTH DIMENSION, INC. MULTICODER, MODEL NO. HDA4M-839, SERIAL NO. 7243.
by L. Bozzella, H. Herget, F. J. Sain, and V. Sheehan. Dec 65, 66p NASA-CR-65407
Contract NAS9-4590
Prepared For Fifth Dimension, Inc. Its Rept.-6387e1244

Descriptors: *Electromagnetic measurement, *Radio interference, *Susceptibility, *Test program, Coder, Electromagnetic, Interference, Measurement, Microminiaturization, Multicomponent, Program, Radio, Requirement, Test.

For abstract, see S 04 16.

N66-29287 **Field 9F**
CFSTI Prices HC$3.00 MF$0.75
General Dynamics/convair, San Diego, Calif.
F M RECEIVER DYNAMIC RESPONSE.
by G. D. Boyce. 25 Jun 65, 80p NASA-CR-72010, GD/C-543-1-65-40

Descriptors: *Discriminator, *Dynamic response, *Frequency modulation, *Radio receiver, Amplitude, Centaur launch vehicle, Dynamic, Frequency, Modulation, Radio, Range, Receiver, Response, Safety, Sensitivity, Telemetry.

For abstract, see S 04 16.

N66-29342 **Field 9F**
CFSTI Prices HC$6.00 MF$1.25
Research Triangle Inst., Durham, N. C. Radiation Systems Lab.
ANALYTICAL STUDY TO DEFINE AN EXPERIMENTAL PROGRAM FOR THE EVALUATION AND OPTIMIZATION OF MULTI-ELEMENT LARGE APERTURE ARRAYS INTERIM REPORT.
Jun 64, 232p NASA-CR-60415
Contract NAS1-3780
Its Rti Program Ru-170

Descriptors: *Antenna array, *Operations research, *Systems analysis, Acquisition, Analysis, Angle, Antenna, Aperture, Array, Characteristics, Instability, Operation, Parameter, Phase, Prototype, Research, Signal, System, Tracking.

For abstract, see S 04 16.

N66-29369 **Field 9F**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EFFECTS OF THE PLASMA SHEATH ON ANTENNA PERFORMANCE.
by H. Hodara, and C. T. Swift. 1965, 45p NASA-TM-X-56860
Contract NAS1-4623
Presented At The Agard/irc Meeting On Radio Wave Propagation Factors In Space Commun., Rome, 21-25 Sep. 1965 Prepared Jointly With Natl. Sci. Eng. Co.

Descriptors: *Antenna field, *Plasma frequency, *Radiation distribution, *Slotted antenna, Admittance, Antenna, Aperture, Coating, Collision, Cylinder, Distribution, Equation, Field, Frequency, Mathematics, Pattern, Plane, Plasma, Problem, Radiation, Slot, Solution, Table, Technique.

For abstract, see S 04 16.

N66-29371 **Field 9F**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
RADIATION PATTERNS AND ADMITTANCE OF AN AXIAL SLOT ON A PLASMA COVERED CYLINDER.
by H. Hodara, C. M. Knop, and C. T. Swift. 1965, 76p NASA-TM-X-56814
Contract NAS1-4623
Presented At The 3d Symp. On The Plasma Sheath Plasma Electromagnetics Of Hypersonic Flight, Boston, 21-23 Sep. 1965 Prepared Jointly With Natl. Eng. Sci. Co.

Descriptors: *Antenna field, *Plasma sheath, *Protective coating, *Slotted antenna, Admittance, Antenna, Axial, Calculation, Coating, Conductance, Cylinder, Equipment, Field, Gap, Geometry, Impedance, Inhomogeneity, Input, Pattern, Plasma, Protection, Radiation, Resonance, Sheath, Slot.

For abstract, see S 04 16.

N66-29393 **Field 9F**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
THE LUNAR ORBITER TELECOMMUNICATIONS SYSTEM.
by E. A. Brummer, W. T. Bundick, and C. H. Green. 1965, 23p NASA-TM-X-56768
Presented At The 1965 Intern. Space Electron. Symp., Miami Beach, Fla., 2-4 Nov. 1965

Descriptors: *Lunar orbit, *Spacecraft communications system, *Telecommunication, Amplitude, Antenna, Apollo project, Communications, Configuration, Design, Equipment, Gain, Ground, Lunar, Modulation, Orbit, Sideband, Spacecraft, System.

For abstract, see S 04 16.

N66-29568 **Field 9F**
CFSTI Prices HC$1.00 MF$0.50
Commonwealth Scientific And Industrial Research Organization, Sydney (Australia). Radiophysics Lab.
OBSERVATIONS OF MARINER IV WITH THE PARKES 210-FT RADIO TELESCOPE.
by D. J. Cole, and P. R. Crosthwaite. Feb 66, 22p NASA-CR-75890, RPL-173
Grant NSG-240-62

Descriptors: *Radio telescope, *Spacecraft tracking, Antenna, Astronomy, Equipment, Frequency, Level, Radio, Receiver, Signal, Spacecraft, Telemetry, Telescope, Tracking.

For abstract, see S 04 16.

N66-29733 **Field 9F**
CFSTI Prices HC$5.00 MF$1.00
New Mexico Univ., Albuquerque. Bureau Of Engineering Research.
EFFECTS OF SURFACE RANDOMNESS OF RADAR BACKSCATTER FROM A SPHERICAL SURFACE.
by A. Erteza, and D. H. Lenhert. 1966, 175p NASA-CR-76016, EE-132
Contract SG-129-61

Descriptors: *Approximation method, *Backscatter, *Electromagnetic wave, *Lunar surface, *Radar, *Surface, Approximation, Electromagnetic, Integral, Lunar, Polarization, Property, Roughness, Solution, Vector, Wave.

For abstract, see S 04 16.

N66-29976 **Field 9F**
CFSTI Prices HC$2.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
THE PRINCIPLE AND DESIGN OF A VERNIER FM RADAR SYSTEM.
by T. Suzuki. 31 May 66, 33p NASA-CR-76086
Grant NSG-213-61
Its Rept.-1388-21

Descriptors: *Frequency modulation, *Radar system, *Signal analysis, Analysis, Design, Distance, Doppler effect, Frequency, Measurement, Modulation, Radar, Range, Resolution, Scale, Signal, System.

For abstract, see S 04 16.

N66-35791 **Field 9F**
CFSTI Prices HC$2.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Dept. Of Electrical Engineering.
ACCURACY OF APPROXIMATE FORMULATIONS FOR NEAR- FIELD WEDGE DIFFRACTION OF A LINE SOURCE.
by R. C. Rudduck, and L. L. Tsai. 15 Mar 66, 31p NASA-CR-77651
Grant NSG-448
Its Rept.-1691-18

Descriptors: *Approximation method, *Cylindrical wave, *Diffraction, *Wedge, Accuracy, Approximation, Cylinder, Edge, Field, Formulation, Line, Method, Near, Source, Theory, Wave.

For abstract, see S 04 21.

N66-35983 **Field 9F**
CFSTI Prices HC$2.50 MF$0.73
Rantec Corp., Calabasas, Calif.

CASSEGRAIN ANTENNA FEED SYSTEM, MODEL ASF-108 FINAL ENGINEERING REPORT.
15 Jun 66, 87p NASA-CR-77769
Contract NAS5-3564
Its Rept.-31796-fri

Descriptors: *Antenna field, *Cassegrain antenna, *Feed system, Alignment, Antenna, Configuration, Design, Electric, Feed, Field, Gain, Graph, Pattern, Performance, Polarization, Radiation, Reception, System, Tracking, Transmission.

For abstract, see S 04 21.

N66-36099 **Field 9F**
CFSTI Prices HC$2.00 MF$0.50
Harvard Univ., Cambridge, Mass. Gordon Mc Kay Lab.
THE CYLINDRICAL ANTENNA WITH TAPERED RESISTIVE LOADING SCIENTIFIC REPORT NO. 5.
by L.-C. Shen, and T. T. Wu. Aug 65, 27p
NASA-CR-68394
Grant NSG-579
Submitted For Publication

Descriptors: *Current distribution, *Dipole antenna, *Electric impedance, *Far field, *Radiation field, Antenna, Current, Cylinder, Dipole, Distribution, Electric, Far, Field, Impedance, Input, Loading, Pattern, Radiation, Resistivity.

For abstract, see S 04 21.

N66-36391 **Field 9F**
CFSTI Prices HC$4.00 MF$1.00
California Computer Products, Inc., Anaheim.
MEDIUM RESOLUTION INFRA- RED (MRIR) EXPERIMENT ENGINEERING MODEL DIGITAL ELECTRONICS TELEMETRY UNIT FOR NIMBUS " B" FINAL ENGINEERING REPORT, 1 NOV. 1965 - 1 APR. 1966.
1966, 139p NASA-CR-77941, DO-301-014
Contract NAS5-9699

Descriptors: *Analog-to-digital converter, *Infrared instrument, *Nimbus satellite, *Telemetry, Analog, Converter, Digital, Electronics, Engineering, Experiment, Infrared, Instrument, Medium, Model, Resolution, Unit.

For abstract, see S 04 21.

N66-36405 **Field 9F**
CFSTI Prices HC$2.00 MF$0.50
Purdue Univ., Lafayette, Ind. Electronic Systems Research Lab.
THEORETICAL AND EXPERIMENTAL STUDIES OF SUB-OPTIMAL SECOND AND THIRD GENERATION SELF-ADAPTIVE BINARY COMMUNICATION SYSTEM SEMIANNUAL REPORT, JAN. 1 - JUN. 30, 1966.
by J. C. Lindenlaub, and C. D. Mc gillem. 1966, 27p NASA-CR-77936
Grant NSG-553

Descriptors: *Channel, *Digital communications system, *Phase lock, *Shift register, Binary, Communications, Digital, Interference, Lock, Loop, Model, Phase, Register, Self-adapting, Sequence, Set, Shift, Signal, Simulator, Symbol, System.

For abstract, see S 04 21.

10A. CONVERSION TECHNIQUES

AD-474 540 **Field 10A, 20M**
CFSTI Prices: HC$3.00 MF$0.75
Battelle Memorial Inst., Columbus, Ohio.
MULTIFUELED THERMAL-ENERGY-CONVERSION SYSTEMS.
Quarterly progress rept. no. 2 (Final), 1 Jan-31 Aug 65,
by Herbert R. Hazard, and Harvey H. Hunter. 31 Aug 65, 64p
Contract DA-28-043-AMC-00431 (E)
Proj. DA-1C6-22001-A-053-03
ECOM-00431-2

Descriptors: (*Energy conversion, *Thermoelectricity), (*Power equipment, Energy conversion), Fuel systems, Generators, Combustion, Fuels, Atomization, Ultrasonic radiation, Hydrocarbons, Performance (Engineering).

Identifiers: Burners.

A multifuel burner utilizing ultrasonic atomization has been developed and successfully demonstrated. Designed for use with a 100-watt thermoelectric generator, the burner must transfer heat at 7 w/sq cm to thermocouple junctions at 900 C, which is accomplished by heating a wire-screen mantle to 1075 C. Burning rate is 1 lb fuel/hr, or 18,000 Btu/hr, but the atomizer and burner design are suitable for burning rates to 50,000 Btu/hr. Fuel properties have no significant effect on performance when firing fuels ranging from aviation gasoline to No. 2 fuel oil, except that the fuel metering valve must be reset with changes in fuel viscosity. The burner is ignited electrically by momentary heating of a glow coil, and full heat output is generated immediately on ignition. Fuel is fed from a tank pressurized to 10 psi and metered with a manual valve; combustion air is supplied by a small fan. The ultrasonic atomizer requires 4 w at 12 v, and the fan requires 5 w. A 12-v battery is required for start-up and for operation until generator power is available. Weight of the demonstration burner is 2.5 lb. (Author)

AD-640 291 **Field 10A, 21E**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
WAVE METHOD OF CALCULATING IMPULSE LOADS OF TURBINE BLADES,
by A. A. Moiseev, A. A. Petrov, and O. I. Mikailov. 25 Apr 66, 10p FTD-TT-1990
TT-66-62433
Unedited rough draft trans. of Sudostroenie (USSR) v30 n11 p33-4 1964.

Descriptors: (*Turbine blades, Loading (Mechanics)), Deformation, Stresses, USSR, Differential equations, Gas turbines.

N66-27187 **Field 10A**
CFSTI Prices HC$1.00 MF$0.50
PLASMA THERMIONIC DIODES.
Dec 64, 18p NASA-CR-60145
Grant NSG-299-63

Descriptors: *Computer method, *Electron energy, *Random distribution, *Thermionic converter, Charge, Computer, Converter, Density, Dimensional, Distribution, Electron, Energy, Method, One, Potential, Random, Thermionic.

For abstract, see S 04 15.

N66-27211 **Field 10A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
NICKEL CADMIUM SPACECRAFT BATTERY CHARGE CONTROL WITH AUXILIARY ELECTRODES.
by K. O. Sizemore, and E. R. Stroup. 1965, 5p
NASA-TM-X-56519
Presented At The Meeting Of The Electrochem. Soc., Buffalo, 10-14 Oct. 1965 Submitted For Publication

Descriptors: *Control device, *Electrode, *Nickel-cadmium battery, *Spacecraft power supply, Battery, Cadmium, Cell, Charge, Control, Device, Gas, Nickel, Power, Pressure, Spacecraft, Supply.

For abstract, see S 04 15.

N66-27242 **Field 10A**
CFSTI Prices HC$5.00 MF$1.00
Naval Ammunition Depot, Crane, Ind.
NASA SPACE CELL TEST PROGRAM MONTHLY PROGRESS REPORT, APR. 1966.
27 May 66, 172p NASA-CR-75379
NASA ORDER W-11252B

Descriptors: *Nickel-cadmium battery, *Silver-cadmium battery, *Silver-zinc battery, Analysis, Battery, Cadmium, Capacity, Cell, Cycle, Data, Electrochemical, Failure, Life, Nickel, Silver, Space, Table, Test, Zinc.

For abstract, see S 04 15.

N66-27243 **Field 10A**
CFSTI Prices HC$7.00 MF$2.00
Electro-optical Systems, Inc., Pasadena, Calif.
DEVELOPMENT OF LIGHTWEIGHT RIGID SOLAR PANEL INTERIM DESIGN REPORT, 1 JAN. - 30 APR. 1966.
18 May 66, 371p NASA-CR-75370, EOS-7027-IDR
Contract NAS7-428

Descriptors: *Energy conversion, *Photovoltaic cell, *Solar cell, *Spacecraft power supply, Array, Cell, Conversion, Design, Energy, Flyby, Lightweight, Mission, Panel, Photovoltaic, Power, Rigid, Silicon, Solar, Source, Spacecraft, Structure, Supply.

For abstract, see S 04 15.

N66-27316 **Field 10A**
CFSTI Prices HC$2.00 MF$0.50
Livingston Electronic Corp., Montgomeryville, Pa.
LOW TEMPERATURE BATTERY FIRST QUARTERLY REPORT, 14 DEC. 1965 - 13 MAR. 1966.
by G. M. Armstrong. 1966, 43p NASA-CR-54970
Contract NAS3-8503

Descriptors: *Battery, *Electrochemical cell, *Structural design, Anode, Cathode, Cell, Construction, Corrosion, Current, Density, Design, Electric, Electrochemical, Electrolyte, Extension, Life, Loading, Low temperature, Paste, Plate, Separator, Structural, Test, Voltage.

For abstract, see S 04 15.

N66-27323 **Field 10A**
CFSTI Prices HC$5.00 MF$1.00
Melpar, Inc., Falls Church, Va.
ANALYSIS, DESIGN AND DEVELOPMENT OF A FLAT PLATE SOLAR THERMOELECTRIC ENERGY CONVERSION PANEL FINAL REPORT, 12 JUN. - 12 DEC. 1963.
1963, 167p NASA-CR-75388
Contract NAS5-3400

Descriptors: *Flat plate, *Solar energy, *Thermoelectric conversion system, Alloy, Bismuth, Coating, Conversion, Couple, Energy, Flat, Panel, Plate, Radiator, Solar, System, Tellurium, Thermoelectric.

For abstract, see S 04 15.

N66-27489 **Field 10A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
SAHA- LANGMUIR SURFACE IONIZATION RELATION.
by R. Breitwieser, and W. Rush. 1965, 17p
NASA-TM-X-52152
Presented At The Thermionic Specialist Conf.

Sponsored By Ieee, San Diego, Calif., 25-27 Oct. 1965

Descriptors: *Ion production, *Surface ionization, *Thermionic converter, Cesium, Charge, Converter, Coupling, Effect, Equation, Ion, Ionization, Motion, Production, Space, Surface, Thermionic.

For abstract, see S 04 15.

N66-27544 **Field 10A**
CFSTI Prices HC$4.00 MF$0.75
Melpar, Inc., Falls Church, Va.
ANALYSIS, DESIGN AND DEVELOPMENT OF A FLAT PLATE SOLAR THERMOELECTRIC ENERGY CONVERSION PANEL FINAL REPORT, 17 APR. - 17 OCT. 1964.
1964, 116p NASA-CR-75381
Contract NAS5-3782

Descriptors: *Energy conversion, *Flat plate, *Solar converter, *Thermoelectric conversion system, Analysis, Conversion, Converter, Design, Development, Electric, Energy, Flat, Generator, Panel, Plate, Power, Solar, System, Thermoelectric.

For abstract, see S 04 15.

N66-27736 **Field 10A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
POSSIBLE SOURCES OF INSTABILITY IN THE COLLISIONLESS THERMIONIC DIODE.
by C. M. Goldstein. Jun 66, 7p NASA-TM-X-1245

Descriptors: *Density distribution, *Stability, *Thermionic diode, Analysis, Characteristic, Collisionless, Current, Cusp, Density, Diode, Distribution, Instability, Thermionic.

For abstract, see S 04 15.

N66-27741 **Field 10A**
CFSTI Prices HC$2.00 MF$0.50
Radio Corp. Of America, Princeton, N. J. Rca Labs.
MATERIALS AND METHODS FOR LARGE-AREA SOLAR CELLS FINAL REPORT, 17 DEC. 1964 - 16 DEC. 1965.
by R. R. Addiss Jr, S. G. Ellis, P. Rappaport, and P. Vohl. 14 Jan 66, 34p NASA-CR-54959
Contract NAS3-6466

Descriptors: *Crystal growth, *Gallium arsenide, *Indium arsenide, *Solar cell, *Spacecraft power supply, *Thin film, Aluminum, Arsenide, Cell, Crystal, Film, Foil, Gallium, Growth, Indium, Power, Satellite, Solar, Spacecraft, Supply, Thin.

For abstract, see S 04 15.

N66-27751 **Field 10A**
CFSTI Prices HC$3.00 MF$0.50
Radio Corp. Of America, Princeton, N. J. Astro-electronics Div.
NIMBUS- B SOLAR-CONVERSION POWER SUPPLY SUBSYSTEM QUARTERLY TECHNICAL REPORT NO. 1, SEP. - NOV. 1965.
24 Jan 66, 60p NASA-CR-75466, AED-R-2889
Contract NAS5-9668

Descriptors: *Nimbus satellite, *Power supply, *Solar cell, *Storage battery, Analysis, Array, Battery, Cell, Circuit, Computer, Conversion, Data, Electronic, Experiment, Module, Power, Solar, Storage, Subsystem, Supply, Theoretical.

For abstract, see S 04 15.

N66-27752 **Field 10A**
CFSTI Prices HC$5.00 MF$1.00
Radio Corp. Of America, Princeton, N. J. Astro-electronics Div.
NIMBUS- B SOLAR-CONVERSION POWER SUPPLY SUBSYSTEM QUARTERLY TECHNICAL REPORT NO. 2, DEC. 1965 - FEB. 1966.
31 Mar 66, 166p NASA-CR-75465, AED-R-2925
Contract NAS5-9668

Descriptors: *Energy conversion, *Nimbus satellite, *Solar converter, *Spacecraft power supply, Battery, Circuit, Control, Conversion, Converter, Electronics, Energy, Meteorology, Module, Power, Protection, Satellite, Spacecraft, Storage, Subsystem, Supply.

For abstract, see S 04 15.

N66-27947 **Field 10A**
CFSTI Prices HC$2.00 MF$0.50
Douglas Aircraft Co., Inc., Newport Beach, Calif. Astropower Lab.
SMALL FUEL CELL TO ELIMINATE PRESSURE CAUSED BY GASSING IN HIGH ENERGY DENSITY BATTERIES PROGRESS REPORT, 30 SEP. - 30 DEC. 1965.
by H. Frank, and M. P. Strier. Jan 66, 35p NASA-CR-75596, SM-48457-Q2
Contract NAS5-9594

Descriptors: *Fuel cell, *Gas pressure, *Silver-zinc battery, Battery, Cell, Density, Energy, Flow, Fuel, Gas, Hydrogen, Life, Miniature, Mixture, Oxygen, Pressure, Seal, Silver, Test, Zinc.

For abstract, see S 04 15.

N66-27956 **Field 10A**
CFSTI Prices HC$1.00 MF$0.50
Electro-optical Systems, Inc., Pasadena, Calif. Power Systems Div.
HYDROGEN-OXYGEN ELECTROLYTIC REGENERATIVE FUEL CELLS PROGRESS REPORT, 1 FEB. - 1 MAR. 1966.
by E. Findl, and M. G. Klein. 10 Mar 66, 24p NASA-CR-75515, EOS-4110-ML-24
Contract NAS3-2781

Descriptors: *Auxiliary power source, *Battery, *Regenerative fuel cell, Auxiliary, Cell, Deposition, Design, Electrode, Electrolyte, Fuel, Gold, Hydrogen, Life, Nickel, Oxygen, Performance, Power, Regeneration, Secondary, Single, Source, Structure, Variance.

For abstract, see S 04 15.

N66-28383 **Field 10A**
CFSTI Prices HC$1.00 MF$0.50
Clevite Corp., Cleveland, Ohio. Electronic Research Div.
STUDY OF THIN FILM LARGE AREA PHOTOVOLTAIC SOLAR ENERGY CONVERTER SECOND QUARTERLY REPORT, 25 FEB. - 24 MAY 1966.
by F. Augustine, W. K. Bower, J. R. Hietanen, and F. A. Shirland. 23 May 66, 22p NASA-CR-54985
Contract NAS3-8502

Descriptors: *Cadmium sulfide, *Energy converter, *Photovoltaic cell, *Solar cell, *Thin film, Area, Cadmium, Cell, Converter, Energy, Film, Large, Photovoltaic, Solar, Sulfide, Thin.

For abstract, see S 04 15.

N66-28417 **Field 10A**
CFSTI Prices HC$2.00 MF$0.50
Princeton Research And Development Co., N. J.
A THEORETICAL AND EXPERIMENTAL STUDY OF RADIATION DAMAGE IN DRIFT-FIELD SOLAR CELLS ANNUAL REPORT.
by J. A. Baicker. 10 May 66, 47p NASA-CR-75688
Contract NAS5-9580

Descriptors: *Radiation effect, *Solar cell, *Space charge, Cell, Charge, Current, Drift, Effect, Epitaxy, Field, Radiation, Reverse, Silicon, Solar, Space, Spectral, Voltage.

For abstract, see S 04 16.

N66-28806 **Field 10A**
CFSTI Prices HC$5.00 MF$1.00
Battelle Memorial Inst., Columbus, Ohio.
AN ADVANCED THERMOELECTRIC COMPONENT DEVELOPMENT PROGRAM FINAL SUMMARY REPORT.
18 Feb 66, 167p NASA-CR-75802
Contract NAS5-9160

Descriptors: *Computer program, *Heat transfer, *High temperature material, *Insulation, *Thermoelectricity, Alloy, Bonding, Code, Computer, Element, Generator, High temperature, Material, Program, Segment, Strength, Structure, Thermal.

For abstract, see S 04 16.

N66-29431 **Field 10A**
CFSTI Prices HC$1.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge. Research Lab. Of Electronics.
SURFACE PROPERTIES OF THERMIONIC ELECTRODES SEMIANNUAL REPORT, 1 NOV. 1964 - 30 APR. 1965.
by R. E. Stickney. 30 Apr 65, 10p NASA-CR-62755
Contract NGR-22-009-091

Descriptors: *Energy converter, *Laboratory apparatus, *Surface property, *Thermionic converter, Apparatus, Chamber, Circuit, Component, Converter, Crystal, Description, Diode, Electrode, Electron, Emitter, Energy, Feedback, Function, Gun, Laboratory, Metal, Planar, Property, Refractory, Surface, Thermionic, Ultrahigh, Vacuum, Work.

For abstract, see S 04 16.

N66-29520 **Field 10A**
CFSTI Prices HC$2.00 MF$0.50
Electro-optical Systems, Inc., Pasadena, Calif.
ADVANCEMENT IN THE STATE OF THE ART IN THE PRODUCTION OF FIELD SOLAR CELLS FINAL REPORT.
by P. Rolik. 16 Dec 65, 48p NASA-CR-75866, EOS-6973-FINAL
Contract NAS5-9612

Descriptors: *Electric field, *Radiation resistance, *Solar cell, Cell, Computer, Damage, Degradation, Drift, Electric, Field, Illumination, Radiation, Resistance, Solar, Sunlight, Tungsten.

For abstract, see S 04 16.

N66-29751 **Field 10A**
CFSTI Prices HC$3.00 MF$0.75
Trw Systems, Redondo Beach, Calif.
CHARGED PARTICLE RADIATION DAMAGE IN SEMICONDUCTORS. XII - EFFECTS OF HIGH ENERGY ELECTRONS IN SILICON AND SILICON SOLAR CELLS FINAL TECHNICAL REPORT, 26 MAY 1965 - 26 MAY 1966.
by J. R. Carter, R. G. Downing, and H. Flicker. 25 May 66, 76p NASA-CR-76043, TRW-4161-6023-RO-000
Contract NAS5-3805

Descriptors: *Charged particle, *Electron bombardment, *Silicon, *Solar cell, Annealing, Bombardment, Cell, Charge, Defect, Electron, Hall effect, Irradiation, Particle, Semiconductor, Solar.

For abstract, see S 04 16.

N66-29761 **Field 10A**
CFSTI Prices HC$1.00 MF$0.50
Electro-optical Systems, Inc., Pasadena, Calif.
HYDROGEN-OXYGEN ELECTROLYTIC REGENERATIVE FUEL CELLS, AUGUST 1 - SEPTEMBER 1, 1965.
by M. Klein. 10 Sep 65, 22p NASA-CR-76031, EOS-4110-ML-20
Contract NAS3-2781

Descriptors: *Electrochemical cell, *Electrode, *Electrolyte, *Regenerative fuel cell, Cell, Electrochemical, Fuel, Hydrogen, Hydroxide, Multicell, Oxygen, Potassium, Pressure, Prototype, Regeneration, Saturation.

For abstract, see S 04 16.

N66-35946 **Field 10A**
CFSTI Prices HC$3.25 MF$1.25
Philco Corp., Palo Alto, Calif. Wdl Div.
EXPERIMENTAL STUDY OF COATINGS FOR TEMPERATURE CONTROL OF SOLAR CELLS.
by D. C. Briggs. 6 Jun 66, 172p NASA-CR-73030, WDL-TR-2949
Contract NAS7-409

Descriptors: *Band pass filter, *Metal coating, *Solar cell, *Temperature control, Band, Cell, Coating, Control, Filter, Interference, Metal, Pass, Reflector, Solar, Temperature.

For abstract, see S 04 21.

N66-35973 **Field 10A**
CFSTI Prices HC$3.75 MF$1.50
Massachusetts Inst. Of Tech., Cambridge. Dept. Of Chemical Engineering.
MIXED-FEED METHANOL-OXYGEN FUEL CELLS.
by S. R. Schulze. Aug 66, 238p NASA-CR-77760
Grant NSG-496

Descriptors: *Chemical fuel, *Electrochemistry, *Fuel cell, *Mixed flow, Anode, Cathode, Cell, Chemical, Current, Efficiency, Electrode, Electrolyte, Flow, Fuel, Mixing, Output, Oxygen, Platinum, Reaction, Selective, Silver.

For abstract, see S 04 21.

N66-36101 **Field 10A**
CFSTI Prices HC$3.00 MF$0.75
Radio Corp. Of America, Princeton, N. J. Astro-electronics Div.
APPLICATION OF GALLIUM-ARSENIDE SOLAR CELLS TO SOLAR PROBE POWER SYSTEMS.
1 Feb 66, 88p NASA-CR-69537, AED-R-2817-1
Contract NAS2-2600
Reissued

Descriptors: *Gallium arsenide, *Solar cell, *Spacecraft power supply, Arsenide, Cell, Control, Degradation, Gallium, Mission, Power, Probe, Semiconductor, Silicon, Solar, Spacecraft, Supply, Temperature, Thermal.

For abstract, see S 04 21.

PB-170 911 **Field 10A**
CFSTI Prices: HC$1.60 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
CONVERTISSEURS A RADIOISOTOPES (Radio-Isotope Converter),
by Thierry Alleau, Bernard Devin, and Michel Vandevyver. Jun 66, 18p CEA-R-2788
Text in French; Summary in English.

Descriptors: (*Radioactive isotopes, *Energy conversion), (*Thermoelectricity, Radioactive isotopes), (*Thermionic converters, Radioactive isotopes), Heating, Radioactive batteries, Alpha decay, Polonium, Curium, Plutonium, Beta decay, Thulium, Strontium, Cerium, Cesium, France.

Identifiers: Thermoelectric generators.

Due to the surface power density required for thermoelectric and thermoionic converters, available radioactive sources are surveyed and listed. Curves of specific minimum diameter versus thermal flux density are given. Po 210 and Cm 242 appear to be suitable for direct thermionic while alpha emitters such as Pu 238 and Cm 244 are still suitable for thermoelectric conversion. This mode will also work with beta emitters Tm 170, Sr 90, Ce 144 and Cs 137. Some thermoelectric radioisotope heated converters are suggested. (Author)

AD-639 803 **See Field 9C**

10B. POWER SOURCES

AD-639 994 **Field 10B**
CFSTI Prices: HC$2.00 MF$0.50
Marquardt Corp., Van Nuys, Calif.
INVESTIGATION OF THE CURRENT DENSITY LIMITATIONS IN A THERMIONIC CONVERTER.
Final rept., 1 Jan-15 Jul 65,
by Coleman Kaplan. Aug 66, 42p Marq-25205
Contract Nonr-3738 (00)
Proj. NR-099-366

Descriptors: (*Thermionic converters, Electrical properties), Plasma physics, Transients, Voltage, Performance (Engineering), Cesium, Xenon.

Transient measurements were made in a thermionic converter to investigate the ion loss mechanism at various operating conditions. A small pulsed increase in current was applied to the converter; just after the pulse an increase in output voltage was observed. The increased voltage then decayed back to the steady-state level. The time constant of the exponential voltage decay is a measure of the average lifetime of ions in the interelectrode space. The report contains an extension of the previous pulsed-discharge measurements to larger spacings and higher xenon pressures. At large electrode spacings the primary ion loss mechanism is volume recombination; at small spacings (20 mils or less) the ions are lost by diffusion to the electrodes, where surface recombination occurs. The volume-recombination lifetime decreases with increasing cesium and/or xenon pressure. The output voltage was measured for a range of spacings extending to over 200 mils, at each value of the current, cesium pressure, and xenon pressure used. It was observed that, at constant current, the output voltage is a linearly-decreasing function of the spacing, for spacings of the order of 100 mils or larger. The decrease in the output voltage with increasing spacing is apparently due to a corresponding increase in the emitter sheath potential. This linear characteristic could prove useful in an analysis of converter theory. (Author)

AD-640 184 **Field 10B, 20C**
CFSTI Prices: HC$4.00 MF$0.75
Varian Associates, Palo Alto, Calif.
RESEARCH ON THERMIONIC ELECTRON EMITTING SYSTEMS.
Final rept. 16 Jun 65-15 Sep 66,
by I. Weissman. 15 Sep 66, 100p Engineering-338-1F
Contract NObs-92494
Proj. SR007-12-01
Task 807

Descriptors: (*Thermionic converters, Thorium), Films, Thermionic emission, Tungsten, Vapor plating, Substrates, Niobium, Performance (Engineering), Thermal stability.

The report deals with the synthesis and evaluation of a unique type of thorium, thin-film, thermionic electron emitter. The synthesis procedure involves chemical vapor deposition of a surface layer of a refractory metal onto a thorium dispensing substrate. The unique features of the process are a high degree of preferred uniaxial crystal orientation which can be obtained in the deposited layer, and a measure of control over the particular direction in the layer that is preferentially oriented. By virtue of this orientation, surfaces can be fabricated consisting predominantly of one of the better emitting crystal planes of the particular combination of substrate and adsorbate and enhanced emission thus realized. In the majority of this year's work the grain-oriented surface layers investigated were tungsten. Three different types of dispensers were evaluated, each utilizing a different thermochemical reaction for production of the free thorium necessary to sustain the surface coverage at emitting temperatures. Both thermal stability of preferred orientation and thermionic emission capabilities were evaluated. Methods were evolved for fabricating the emitting structures so as to enhance thermal stability. The emitters tested exhibited a spread of over 15% in their measured values of vacuum work function (3.0 to 3.55 eV). With a single exception they exhibited high thermionic constants (70-120). Thermal stability was good for one type of dispenser evaluated, and relatively poor for the other two. A deposition system was built for fabricating dispenser emitters with niobium surface layers, and experiments were done which show that a measure of selectivity over preferred orientation can be achieved for niobium just as it can for tungsten.

AD-640 521 **Field 10B**
CFSTI Prices: HC$6.00 MF$1.25
General Electric Co., West Lynn, Mass. Direct Energy Conversion Operation.
HYDROCARBON - AIR FUEL CELLS.
Semi-annual technical summary rept. no. 9, 1 Jan-30 Jun 66.
30 Jun 66, 243p
Contract DA-44-009-AMC-479 (T), ARPA Order-247
Rept. on Fuel Cell Research and Development.
See also AD-634 078.

Descriptors: (*Fuel cells, Design), (*Catalysts, Fuel cells), (*Electrodes, Fuel cells), (*Electrolytes, Fuel cells), Hydrocarbons, Oxidation, Oxidizers, Air, Alloys, Propanes, Carbides, Adsorption, Catalysis, Anodes (Electrolytic cell), Cathodes (Electrolytic cell), Reduction (Chemistry), Hydrogen, Carbon monoxide, Fuels, Foams, Exhaust gases.

Identifiers: Octanes.

Detailed information is presented on a continuing research and development program to develop a direct hydrocarbon oxidation-air fuel cell technology. Current work included research on electrocatalysts, electrode structures, multi-component fuels, and investigations with alternate acid electrolytes. A number of alloys and non-alloys were studied as catalysts for the oxidation of hydrocarbon fuels. The development of supported electrocatalysts and related electrode structures is discussed. The behavior of fuel mixtures of saturated hydrocarbons and the effects of other components such as olefins, aromatics and naphthenes are reported. Performance of hydrofluoric acid electrolyte operating with octane and its relationship to voltage cycling phenomena is discussed. (Author)

N66-27057 **Field 10B**
CFSTI Prices HC$7.00 MF$1.75
Trw Equipment Labs., Cleveland, Ohio.
TRW SPACE RADIATOR-CONDENSER DESIGN AND PERFORMANCE ANALYSIS COMPUTER PROGRAMS USERS' MANUAL.
Apr 66, 340p NASA-CR-65362, ER-6792
Contract NAS9-4884

Descriptors: *Computer program, *Condenser radiator, *Space radiator, Analysis, Computer, Condenser, Design, Dynamics, Fluid, Fortran, Heat transfer, Instruction, Manual, Performance, Program, Radiator, Space, Thermodynamics.

For abstract, see S 04 15.

N66-27080 Field 10B
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
FIRST ELECTRIC POWER SYSTEM IN AEROSPACE.
by E. M. Cohn. 1963, 7p NASA-TM-X-56704
Submitted For Publication

Descriptors: *Balloon, *Lamp, *Light source, Battery, Cell, Electric, Electrochemical, Fluorescence, Light, Portability, Power, Source, Storage.

For abstract, see S 04 15.

N66-28038 Field 10B
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Lewis Research Center, Cleveland, Ohio.
EFFECT OF TURBINE-COOLANT FLOW ON BRAYTON- CYCLE SPACE-POWER SYSTEM THERMODYNAMIC PERFORMANCE.
by A. J. Glassman. Jun 66, 17p NASA-TN-D-3474

Descriptors: *Brayton cycle, *Coolant, *Performance characteristics, *Spacecraft power supply, *Thermodynamic efficiency, *Turbine, Characteristics, Efficiency, Flow, Performance, Power, Radiator, Spacecraft, Supply, Temperature, Thermodynamic.

For abstract, see S 04 15.

N66-29316 Field 10B
CFSTI Prices HC$5.00 MF$1.00
Polish Academy Of Sciences, Warsaw.
ELECTRICAL PARAMETERS OF THE DC MHD GENERATOR WITH VARIOUS ELECTRICAL CONNECTIONS OF ELECTRODES.
Parametry Elektryczne Generatora Mangetohydrodynamicznego Przy Roznych Elektrycznych Polaczeniach Elektrod
by Z. N. Celinski, and A. Jednowymiarowa. May 65, 177p INR-654/XVIII/PP
In Polish, English Summary

Descriptors: *Electrode, *Magnetohydrodynamic generator, *Plasma physics, Current, Dc, Electric, Generator, Magnetohydrodynamic, Physics, Plasma, Poland, Power, Resistance, Voltage.

For abstract, see S 04 16.

N66-29685 Field 10B
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Lewis Research Center, Cleveland, Ohio.
FEASIBILITY STUDIES OF SPACE RADIATORS USING VAPOR CHAMBER FINS.
by H. C. Haller, and S. Lieblein. 1966, 30p NASA-TM-X-52219
Presented At Heat Pipe Conf., Albuquerque, N. Mex., 1 Jun. 1966, Sponsored By Aec And Sandia Labs.

Descriptors: *Fin, *Power plant, *Space radiator, *Vapor, Application, Capillary, Chamber, Flow, Geometry, Plant, Power, Radiator, Rankine cycle, Sensitivity, Space, System, Weight.

For abstract, see S 04 16.

N66-29906 Field 10B
CFSTI Prices HC$4.00 MF$1.00
Airesearch Mfg. Co., Phoenix, Ariz.
BRAYTON CYCLE 3.2-INCH RADIAL COMPRESSOR PERFORMANCE EVALUATION.
by H. H. Milligan, and G. L. Perrone. May 66, 130p NASA-CR-54968, APS-5211-R
BRAYTON CYCLE 3.2-INCH RADIAL COMPRESSOR PERFORMANCE EVALUATION.
by H. H. Milligan, and G. L. Perrone. May 66, 130p NASA-CR-54968, APS-5211-R
Contract NAS3-6463

Descriptors: *Brayton cycle, *Compressor efficiency, *Reynolds number, Air, Component, Compressor, Diameter, Diffusion, Duct, Efficiency, Flow, Fluid, Geometry, Impeller, Inch, Inlet, Low, Performance, Point, Power, Pressure, Radial, Space, Stage, Three, Two.

For abstract, see S 04 16.

N66-35660 Field 10B
CFSTI Prices HC$3.25 MF$1.75
Trw Equipment Labs., Cleveland, Ohio.
BIPROPELLANT PULSED ENERGY TURBOALTERNATOR POWER SYSTEM DEVELOPMENT FINAL REPORT, SEP. 1, 1965 - JUL. 14, 1966.
Aug 66, 191p NASA-CR-65499, ER-6917
Contract NAS9-4820

Descriptors: *Bipropellant, *Gas generator, *Power generator, *Pulsed generator, *Turboalternator, Coast, Consumption, Control, Endurance, Energy, Gas, Generator, Level, Oxidizer, Performance, Power, Propellant, Pulse, Ratio, System, Temperature, Test, Time.

For abstract, see S 04 21.

N66-35689 Field 10B
CFSTI Prices HC$6.00 MF$1.25
General Electric Co., Philadelphia, Pa. Missile And Space Div.
9.5-FOOT PARABOLOIDAL MASTER AND CONCENTRATOR FINAL REPORT.
30 Jun 66, 211p NASA-CR-66122
Contract NAS1-4105
Its Doc.-66sd4391

Descriptors: *Centrifugal casting, *Concentrator, *Electroforming, *Paraboloidal mirror, Aluminum, Casting, Centrifugal, Collector, Epoxy, Mirror, Nickel, Paraboloid, Solar, Spin.

For abstract, see S 04 21.

N66-36109 Field 10B
CFSTI Prices HC$4.25 MF$1.75
General Electric Co., Philadelphia, Pa. Missile And Space Div.
THERMAL INTEGRATION OF ELECTRIC POWER AND LIFE SUPPORT SYSTEMS FOR MANNED SPACE STATIONS.
by E. P. Erlanson, and R. W. Woods. Sep 66, 323p NASA-CR-543
Contract NAS3-6478

Descriptors: *Life support system, *Manned orbital space station (moss), *Power supply, Attitude, Control, Electric power, Environment, Integration, Life, Manned, Moss, Orbital, Power, Space station, Supply, Support, System, Thermal.

For abstract, see S 04 21.

AD-639 754 **See Field 20I**

AD-639 803 **See Field 9C**

10C. ENERGY STORAGE

AD-469 278 Field 10C
CFSTI Prices: HC$3.00 MF$0.75
Edison (Thomas A.) Industries, Bloomfield, N. J. Primary Battery Div.
AUXILIARY ELECTRODE FOR CHARGE CONTROL OF SEALED NICKEL-CADMIUM BATTERIES.
Quarterly progress rept. no. 4, 15 Mar-14 Jun 65, by Philip F. Grieger. 14 Jun 65, 72p
Contract DA-28-043-AMC-00152 (E)
Proj. DA-1C6-22001-A-053-02
See also AD-456 849, AD-458 044, AD-466 291 and AD-475 526.

Descriptors: (*Batteries + components, Primary cells), (*Storage batteries, Electrodes), (*Alkaline cells, Electrodes), Nickel, Cadmium, Hermetic seals, Oxygen, Electrolytes, Potassium compounds, Hydroxides, Performance (Engineering), Battery chargers, Control.

As called for by the Main Experiment (16 cells and 6 spares) VCB Black auxiliary electrodes were installed in 22 cells made from Gulton VO7 cells. 30% KOH corresponding to the semi-dry level was added, and the auxiliaries were pretested (1 atm. O2, room temp.) by measuring signaling circuit voltage and current for various resistances, while charging the cells at 0.35 amp. Performance was about that expected, and judged to be satisfactory. Replicability was better for top than side position. With supplemental 30% KOH (3.5 and 14 ml for wet and excess levels respectively) performance was reduced slightly for the top position but drastically for the side position. 16 cells (4 semi-dry, 2 wet, 2 excess, for both positions) were discharged completely, filled with O2, and are being conditioned, prior to making the Main Experiment tests. 22 similar cells are being made from Union Carbide N78 cells. (Author)

AD-639 709 Field 10C
CFSTI Prices: HC$4.00 MF$1.00
Electric Storage Battery Co., Yardley, Pa.
HIGH ENERGY SYSTEM (ORGANIC ELECTROLYTE).
Final rept. 15 Jun 65-14 Jun 66,
by D. P. Boden, H. R. Buhner, and V. J. Spera.
Sep 66, 126p
Contract DA-28-043-AMC-01394 (E)
Proj. DA-1C6-22001-A-053
Task 1C6-22001-A-053-02
ECOM-01394-F

Descriptors: (*Batteries + components, Organic materials), (*Electrolytes, Organic materials), (*Wet cells, Organic materials), Organic solvents, Propenes, Carbonates, Sulfites, Lithium compounds, Perchlorates, Anodes (Electrolytic cell), Lithium, Foils, Cathodes (Electrolytic cell), Copper compounds, Fluorides, Binders, Battery separators, Electrical properties.

Identifiers: Cupric fluoride, Lithium perchlorate, Methyl carbonates, Methyl sulfites, Organic batteries, Propylene carbonate.

The report describes a project to develop a system capable of delivering energy in excess of 200 w-hrs/lb of total battery weight. Screening tests at the beginning of the program indicated that the lithium/cupric fluoride system offered the best possibility of success. Electrolyte studies indicated that the most promising solvents were propylene carbonate, dimethyl carbonate and dimethyl sulphite which in conjunction with lithium perchlorate yielded electrolytes having adequate conductance and which were inert towards the electrode materials. Anode studies revealed that lithium electrodes prepared from commercially available foil could be discharged over a wide range of current densities yielding high coulombic efficiency without appreciable polarization. The most encouraging techniques for cupric fluoride cathode fabrication were found to be a hot pressing method using polyethylene as a binder and a cold pressing method using paper floc as a binder. Multiplate assemblies were constructed containing nine electrodes and having a nominal capacity of 7 a.h. These were capable of being discharged in 1 F Li Cl O4/propylene carbonate electrolyte at 2 ma/sq. cm. (250 ma) to yield 1 17 w-hrs/lb of total battery weight. (Author)

AD-640 031 Field 10C
CFSTI Prices: HC$2.00 MF$0.50
Livingston Electronic Corp., Montgomeryville, Pa.
LIQUID AMMONIA BATTERIES.

Monthly progress rept. no. 10.
Jun 65, 29p
Contract DA-28-017-AMC-1542 (A)

Descriptors: (*Ammonia, *Batteries + components), Electrolytic cells, Liquefied gases, Performance (Engineering), Voltage, Manufacturing methods, Wet cells.

A design review was conducted covering the total program. Consideration was given to the feasibility of a change in form factor for either battery design to accommodate more economically a revised set of electrical requirements. It was decided that no change was warranted in external form factor but that an internal design modification (cell structure) would be desirable for the 'A' battery. A completely new and revised design for the 'A' battery cells was established, tested on a single cell basis, and tested on a cell stack subassembly basis. 'B' battery single cells were tested against a revised set of electrical specifications. Cell assembly drawings and part drawings were established for 'A' battery cell design. This was brought on by the economics of testing total cell stack packages in which the total investment of construction is considerably more than single cells. (Author)

AD-640 053 **Field 10C, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J.
DRY PROCESS DIVALENT SILVER OXIDE ELECTRODES.
Technical rept.,
by Nicholas T. Wilburn, and Charles J. Bradley.
Sep 66, 19p ECOM-2749
Proj. DA-1C6-22001-A053-02

Descriptors: (*Guided missile batteries, Electrodes), (*Alkaline cells, Electrodes), (*Electrodes, Silver compounds), Oxides, Manufacturing methods, Mechanical properties, Binders, Vibration.

Identifiers: Silver oxides, Silver-zinc cells.

The development of the dry process method, a new technique for fabricating divalent silver oxide (AgO) electrodes for use in zinc-silver oxide batteries, was accomplished at USAECOM and reported in AD-622 698. This report indicated that these electrodes were superior to the conventional electroformed ones in many respects such as cost, voltage regulation and discharge efficiency. Evidence was lacking, however, as to comparable mechanical strength, a strong point of the electroformed electrode and an important factor in reliability, particularly under missile environments. This report presents evidence of high mechanical strength of the dry process electrodes, sufficient for missile usage. It also presents data on an improvement in the dry process, the elimination of the sodium carboxymethylcellulose (CMC) binder, which could simplify production methods and thereby further reduce costs. (Author)

AD-640 387 **Field 10C**
CFSTI Prices: HC$1.00 MF$0.50
Gulton Industries, Inc., Metuchen, N. J. Alkaline Battery Div.
DESIGN, FABRICATION OF PROTOTYPES AND TESTING OF VENTED, RECHARGEABLE SILVER-CADMIUM CELLS.
Interim quarterly rept.,
by P. Ritterman, and J. Liska. Sep 66, 21p
Contract DA-36-039-AMC-03359 (E)
Proj. DA-1C6-22001-A-053
Task 1C6-22001-A-053-02-29
ECOM-03359-1
See also AD-624 407.

Descriptors: (*Batteries + components, Alkaline cells), (*Alkaline cells, Design), Electrodes, Silver, Cadmium compounds, Oxides, Maintenance, Performance (Engineering), Storage.

The work was concerned with the development of pasted silver and pressed cadmium electrodes. Three cells, 15 ampere-hour capacity, were built using the new electrodes. Available test data show the cells with the pressed cadmium oxide electrodes to yield superior performance over the cadmium metal electrode. The two cells with the cadmium oxide electrodes performed satisfactorily when subjected to the capacity and cold temperature discharges. During the seven day charged storage test at 160F, the two cells gave 11.6 ampere-hours, just short of the 12.0 ampere-hours specified. New tests are being conducted with an improved cadmium oxide mix electrode to improve capacity after high temperature storage. (Author)

N66-27496 **Field 10C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
ENERGY ACCUMULATOR IN OPTIMIZATION PROBLEMS OF SPACEFLIGHT WITH LIMITED POWER.
Nakopitel' Energii V Zadachakh Optimizatsii Kosmicheskogo Poleta S Ogranichennoy Moshchnost'yu
by G. L. Grodzovskiy, B. N. Kiforenko, and V. V. Tokarev. May 66, 32p NASA-TT-F-10132
Transl. Into English From Russian

Descriptors: *Energy storage device, *Low thrust propulsion, *Propulsive fluid accumulator (profac), Accumulator, Control, Device, Energy, Equation, Field, Fluid, Force, Low thrust, Optimal, Orbit, Profac, Propulsion, Satellite, Space flight, Storage.

For abstract, see S 04 15.

N66-27530 **Field 10C**
CFSTI Prices HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
RADIATION EFFECTS ON SILVER AND ZINC BATTERY ELECTRODES, IV INTERIM REPORT, JAN. - APR. 1966.
by R. E. Kelchner, W. A. Mc collum, M. M. Nicholson, and H. L. Recht. 27 May 66, 37p
NASA-CR-75394, AI-66-83
Contracts NAS7-100, JPL-951109
Prepared For Jpl

Descriptors: *Electrode, *Gamma radiation, *Radiation effect, *Silver oxide, Battery, Capacity, Cobalt 60, Discharge, Effect, Evolution, Gamma, Gas, Loss, Material, Oxide, Radiation, Silver, Solid.

For abstract, see S 04 15.

N66-29083 **Field 10C**
CFSTI Prices HC$2.00 MF$0.50
Monsanto Research Corp., Everett, Mass. Boston Lab.
DEVELOPMENT OF THE DRY TAPE BATTERY CONCEPT QUARTERLY REPORT NO. 3, 9 DEC. 1965 - 8 MAR. 1966.
by J. J. Byrne, J. S. Driscoll, and D. L. Williams.
28 Apr 66, 43p NASA-CR-54981, MRB5010Q3
Contract NAS3-7624

Descriptors: *Battery, *Chemical property, *Electric property, *Material testing, Anode, Cathode, Characteristics, Chemical, Chlorine, Compound, Discharge, Dry, Electric, Electrolyte, Environment, Magnesium, Material, Performance, Property, Tape, Testing.

For abstract, see S 04 16.

N66-29084 **Field 10C**
CFSTI Prices HC$3.00 MF$0.75
Douglas Aircraft Co., Inc., Newport Beach, Calif. Astropower Lab.
PROGRAM TO DEVELOP AN INORGANIC SEPARATOR FOR A HIGH TEMPERATURE SILVER-ZINC BATTERY QUARTERLY PROGRESS REPORT, 29 JAN. - 29 APR. 1966.
by F. C. Arrance, C. Berger, and A. Himy. May 66, 66p NASA-CR-54987, SM-48461-Q3
Contract NAS3-7639

Descriptors: *Inorganic compound, *Materia testing, *Performance characteristics, *Separator, *Silver-zinc battery, Battery, Characteristics, Compound, Gas, Inorganic, Interaction, Life, Material, Performance, Silver, Test, Testing, Zinc.

For abstract, see S 04 16.

N66-29446 **Field 10C**
CFSTI Prices HC$4.00 MF$0.75
Livingston Electronic Corp., Montgomeryville, Pa.
DEVELOPMENT OF HIGH ENERGY DENSITY PRIMARY BATTERIES 200 WATT HOURS PER POUND TOTAL BATTERY WEIGHT MINIMUM FINAL REPORT, 10 JUN. 1964 - 9 JUN. 1965.
by S. G. Abens, T. X. Mahy, W. Merz, and W. F. Meyers. 1965, 110p NASA-CR-54803
Contract NAS3-6004

Descriptors: *Battery, *Energy density, *Lithium, Anode, Carbonate, Cell, Copper, Density, Discharge, Energy, Fluoride, Formate, Hour, Methyl, Primary, Propylene, Solvent, Watt.

For abstract, see S 04 16.

N66-29760 **Field 10C**
CFSTI Prices HC$7.00 MF$2.00
Naval Ammunition Depot, Crane, Ind. Quality Evaluation Lab.
EVALUATION PROGRAM FOR SECONDARY SPACECRAFT CELLS SECOND ANNUAL REPORT OF CYCLE LIFE TEST.
by D. E. Mains. 13 May 66, 377p NASA-CR-76034, QE/C-66-304
NASA ORDER W-11252-B

Descriptors: *Cycling, *Electric cell, *Life, *Nickel-cadmium battery, *Performance characteristics, *Silver-cadmium battery, Battery, Cadmium, Cell, Characteristic, Electric, Nickel, Performance, Silver, Test, Zinc.

For abstract, see S 04 16.

N66-36090 **Field 10C**
CFSTI Prices HC$4.00 MF$1.00
Naval Ammunition Depot, Crane, Ind.
LIFE CYCLE TESTS MONTHLY PROGRESS REPORT, 1-31 AUG. 1965.
1965, 148p NASA-CR-77885
NASA ORDER W-11252-B

Descriptors: *Lifetime, *Nickel-cadmium battery, *Silver-cadmium battery, *Silver-zinc battery, Battery, Cadmium, Capacity, Cell, Cycle, Data, Electrochemical, Life, Nickel, Silver, Table, Test, Zinc.

For abstract, see S 04 21.

N66-36372 **Field 10C**
CFSTI Prices HC$2.00 MF$0.50
Douglas Aircraft Co., Inc., Newport Beach, Calif. Astropower Lab.
PROGRAM TO DEVELOP AN INORGANIC SEPARATOR FOR A HIGH TEMPERATURE SILVER-ZINC BATTERY QUARTERLY PROGRESS REPORT, 29 APR. - 29 JUL. 1966.
by F. C. Arrance, C. Berger, and A. Himy. Jul 66, 33p NASA-CR-72062, SM-48461-Q4
Contract NAS3-7639

Descriptors: *Material testing, *Separator, *Silver-zinc battery, Battery, Case, Cell, Component, Cover, Cycling, Design, Electrochemical, Electrode, Frame, High temperature, Inorganic, Material, Orientation, Silver, Testing, Zinc.

For abstract, see S 04 21.

11A. ADHESIVES AND SEALS

AD-468 336 **Field 11A**
CFSTI Prices: HC$1.00 MF$0.50
Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
AN EVALUATION OF SEVERAL STRUCTURAL ADHESIVES FOR USE AT ELEVATED TEMPERATURES.
Technical memo,
by Raymond F. Wegman, and Richard H. Dickinson. Aug 65, 20p
Proj. DA-1C024401A110
PA-TM-1652

Descriptors: (*Adhesives, Epoxy plastics), (*Epoxy plastics, Adhesives), (*Heat resistant plastics, Adhesives), High temperature research, Bonding, Adhesion, Aluminum, Low temperature research, Shear stresses, Mechanical properties.

Nine commercial adhesives based essentially on epoxy resins were evaluated for use in structural applications where the service temperatures may vary from 154 C. up to 250 C. The shear strength of the adhesive bonds to aluminum within a temperature range extending from -54 C. to that temperature at which the bond strength would fall below 1000 psi was determined. A shear strength of 1000 psi was arbitrarily established as the minimum acceptable strength; hence, testing of individual adhesives was discontinued at that point. The flexural strength of several of the adhesives was determined at 23 C. (Author)

N66-29209 **Field 11A**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EFFECT OF THICKNESS AND SWEEP ANGLE ON THE LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF SLAB DELTA PLANFORMS AT A MACH NUMBER OF 20.
by D. C. Marcum Jr. and R. D. Witcofski. Jun 66, 90p NASA-TN-D-3459

Descriptors: *Aerodynamic characteristics, *Delta wing, *Hypersonic speed, *Sweepback angle, *Wing planform, Aerodynamic, Angle, Attack, Center, Characteristics, Delta, Drag, Effect, Lift, Longitudinal, Model, Planform, Pressure, Ratio, Slab, Sweepback, Thickness, Tunnel, Wind, Wing.

For abstract, see S 04 16.

N66-35949 **Field 11A**
CFSTI Prices HC$2.00 MF$0.50
Union Carbide Plastics Co., Bound Brook, N. J. Polymer Research And Development Dept.
SATURATED HYDROCARBON POLYMERIC BINDER FOR ADVANCED SOLID PROPELLANT AND HYBRID SOLID GRAINS QUARTERLY REPORT NO. 3, 1 MAY - 31 JUL. 1966.
by A. C. Ashcraft Jr, J. E. Potts, E. M. Sullivan, and E. W. Wise. 1966, 32p NASA-CR-77796
Contracts NAS7-100, JPL-951210
Prepared For Jpl

Descriptors: *Copolymer, *Hybrid propellant, *Hydrocarbon fuel, *Propellant binder, *Solid propellant, Binder, Chromatography, Ethylene, Fuel, Gel, Hybrid, Hydrocarbon, Permeation, Polymer, Propellant, Saturation, Solid.

For abstract, see S 04 21.

11B. CERAMICS, REFRACTORIES, AND GLASSES

AD-468 828 **Field 11B, 21H**
CFSTI Prices: HC$7.00 MF$1.75
Union Carbide Research Inst., Tarrytown, N. Y.
RESEARCH ON PHYSICAL AND CHEMICAL PRINCIPLES AFFECTING HIGH TEMPERATURE MATERIALS FOR ROCKET NOZZLES. VOLUME I.
Final rept.,
by Patrick N. Walsh. Aug 65, 345p
Contract DA-30-069-ORD-2787, ARPA Order-34-63-4
See also Volume II, AD-468 829 and Volume III, AD-468 830.

Descriptors: (*Rocket motor nozzles, *Refractory materials), (*Vaporization, Refractory metals), Heat-resistant materials, Carbides, Nitrides, Graphite, Tungsten, Brittleness, Oxidation, Reaction kinetics, Gases, Solids, Nitrogen, Carbon dioxide, Boron, Titanium, Hydrogen, Hafnium, Mass spectroscopy, Palladium, Zirconium compounds, Boron compounds, Oxides, Chemical properties.

Contents: Chemical properties: gas-solid reaction studies; mass-spectrometric studies; and spectroscopic studies.

AD-639 726 **Field 11B, 20B**
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
ORIENTED GROWTH OF DEHYDRATION PRODUCTS OF CALCIUM SULFATE DIHYDRATE.
by K. J. Richards. 8 Feb 66, 3p ARL-66-0163
Availability: Published in Journal of the American Ceramic Society v49 n6 p342 Jun 1966.

Descriptors: (*Gypsum, Dehydration), (*Calcium compounds, Sulfates), Hydrates, Single crystals, Phase studies, X-ray diffraction analysis, Crystal structure.

Identifiers: Calcium sulfates.

The note presents observations on the formation of the dehydration phases produced during the thermal dehydration of naturally occurring single crystals of gypsum.

AD-639 856 **Field 11B, 20B, 13H**
Not available from CFSTI.
Research and Advanced Development Div., Avco Corp., Wilmington, Mass.
GRAIN SIZE EFFECTS IN POLYCRYSTALLINE CERAMICS.
by R. M. Spriggs, T. Vasilos, and L. A. Brissette. 1966, 32p
Contracts DA-31-124-ARO (D)-168, NOw-64-0217
AROD-4299:1
Availability: Published in Materials Science Research v3 p313-44 1966.

Descriptors: (*Ceramic materials, Grain size), Oxides, Dies, Sintering, Microstructure, Mechanical properties, Aluminum compounds, Oxides, Magnesium compounds.

The interrelationships of pressure-sintering processing conditions in the graphite-die, ceramic-die, and ultrahigh pressure regimes, resulting microstructures, and mechanical properties are described, particularly for dense, pure, submicron and near-submicron grain size ceramic oxides. Strength increases with decreasing grain size appear to be limited by structural subtleties which result from the processing techniques employed. Very fine-grained, highly dense ceramics, as initially prepared, have strengths which are less than would be predicted on the basis of decreasing grain size. However, they respond to additional processing variations and post-fabrication treatments with changes in surface and interior structure and considerable relative strengthening. (Author)

AD-640 097 **Field 11B, 20E**
CFSTI Prices: HC$3.00 MF$0.75
Eastman Kodak Co., Rochester, N. Y. Appartuas and Optical Div.
HIGH ENERGY LASER GLASS MATERIAL TECHNIQUES.
Final rept.
Sep 66, 70p
Contract DA-01-021-AMC-12642 (Z)

Descriptors: (*Lasers, *Glass), Neodymium, Rods, Doping, Casting, Light transmission, Fluorescence, Manufacturing methods, Performance (Engineering).

A total of twenty-two new neodymium doped laser glasses were made and compared to the standard Kodak ND-11 silicate based glass. One of these compositions shows promise of having a significantly improved durability under laser action at high energy densities. Several others in certain sizes show improved efficiency. An unwinding technique has also been developed for the fabrication of large laser rods from precast blocks of equal volume, but of much smaller size. Laser rods up to 72 inches were delivered for evaluation to the U. S. Army Missile Command, Redstone Arsenal, Alabama. (Author)

NBS-BSS-5 **Field 11B**
CFSTI Prices: HC$0.35 MF$0.50
National Bureau of Standards, Washington, D. C. Building Research Div.
INTERRELATIONS BETWEEN CEMENT AND CONCRETE PROPERTIES, PART 2. SULFATE EXPANSION, HEAT OF HYDRATION, AND AUTOCLAVE EXPANSION.
Building Science Series,
by R. L. Blaine, H. T. Arni, and D. N. Evans. 1 Jul 66, 51p
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20402, $0.35, see also C13.29/2:2.

Descriptors: (*Cements, Deformation), (*Thermal properties, Cements), Concrete, Test, Chemical properties, Statistical analysis, Aging (Materials), Sulfates.

Contents: Variables associated with expansion in the potential sulfate expansion test, Heat of hydration of portland cement, Variables associated with small autoclave expansion values of portland cements.

N66-29208 **Field 11B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
AN EXPERIMENTAL STUDY OF THE OXIDATION OF GRAPHITE IN HIGH-TEMPERATURE SUPERSONIC AND HYPERSONIC ENVIRONMENTS.
by I. M. Miller, and K. Sutton. Jul 66, 44p
NASA-TN-D-3444

Descriptors: *Air, *Gas mixture, *Graphite, *High temperature environment, *Hypersonic flow, *Oxidation, *Supersonic flow, Diffusion, Environment, Flow, Gas, High temperature, Hypersonic, Mixture, Nitrogen, Supersonic, Theory.

For abstract, see S 04 16.

N66-29974 **Field 11B**
CFSTI Prices HC$1.00 MF$0.50
United Aircraft Corp., East Hartford, Conn. Research Labs.
INVESTIGATION OF THE KINETICS OF CRYSTALLIZATION OF MOLTEN BINARY AND TERNARY OXIDE SYSTEMS QUARTERLY STATUS REPORT NO. 3, MAR. 1 - MAY 31, 1966.
by J. F. Bacon. 30 Jun 66, 11p NASA-CR-76084, E910373-3
Contract NASW-1301

Descriptors: *Crystallization, *Glass, *Oxide, *Youngs modulus, Aluminum, Compound, Electric, Frequency, Magnesium, Modulus, Resistivity, Resonance, Rod, Silicon, System, Viscosity.

For abstract, see S 04 16.

N66-36121 Field 11B
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
FRICTION CHARACTERISTICS OF SINGLE-CRYSTAL AND POLYCRYSTALLINE ALUMINUM OXIDE IN CONTACT WITH VARIOUS METALS IN VACUUM.
by D. H. Buckley. Sep 66, 18p NASA-TN-D-3593
Contract 129-03-13-02-22

Descriptors: *Aluminum oxide, *Friction measurement, *Single crystal, *Vacuum, Adhesion, Aluminum, Ceramic, Characteristics, Coefficient, Crystal, Friction, Measurement, Metal, Oxide, Sapphire, Single, Sliding.

For abstract, see S 04 21.

PB-170 916 Field 11B, 7A
CFSTI Prices: HC$9.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ETUDE, PAR ADSORPTION GAZEUSE, DE LA TEXTURE DES SOLIDES DIVISES (APPLICATION A LA GLUCINE, A L'ALUMINE ET A DIFFERENTS GELS ET OXYDES) (Texture Study of Divided Solids by Gas Adsorption: Application to Beryllia, Alumina and to Gels and Oxides).
Doctoral thesis in French,
by Francoise Rouguerol. 1966, 95p CEA-R-2947
Text in French; Attached Summary in English.

Descriptors: (*Porous materials, Surface area), (*Beryllium compounds, Porosity), (*Aluminum compounds, Porosity), (*Gels, Surface area), (*Oxides, Surface area), Test equipment, Gases, Adsorption, Monomolecular films, Argon, Nitrogen, Hydroxides, Microstructure, Dehydration, France.

Identifiers: Aluminum oxides, Beryllium hydroxides, Beryllium oxides.

A certain number of porous materials were studied in a newly developed adsorption apparatus which permits a measurement of the surface area with a reproducibility as good as 1/1000. It is shown that this is only obtained at the cost of a number of necessary precautions in the measurement of the gaseous volume adsorbed in a monomolecular layer (especially in the case of microporous solids). It also appears convenient to substitute argon for nitrogen, the latter being sensitive to chemical or electrical interactions with the adsorbant. It is also shown that a certain number of lamelar, non porous, systems, such as Be (OH)2 present a hysteresis branch on the adsorption isotherm which can be ascribed to the lack of rigidity of the solid. Samples of microporous texture ($r < 20$ A) of the type of beryllia, provide the case of porous materials which do not exhibit a hysteresis phenomenon. The above conclusions permit the description of the evolution of the texture during progressive dehydration (thermal treatment from 150 to 1100C) of two series of samples, namely beryllia and alumina. (Author)

PB-173 283 Field 11B, 13B, 13M
CFSTI Prices: HC$3.00 MF$0.75
Missouri Univ., Columbia. Dept. of Civil Engineering.
CREEP AND DAMPING CHARACTERISTICS OF CONCRETE,
by Donald R. Buettner, and Pravin D. Bhavsar.
Jun 66, 66p
Report on Effect of creep and shrinkage on the deflection of reinforced concrete bridges. Prepared in cooperation with Missouri State Highway Commission and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Concrete, Damping), (*Creep, Concrete), Missouri, Rheology, Cylindrical bodies, Roads, Bridges, Reinforced concrete, Deflection, Shrinkage.

The report presents the results of dynamic tests on concrete cylinders to determine damping characteristics, and attempts to relate these results to creep in plain concrete. Testing consisted of producing an impact loading on the cylinders, picking up the impulses with accelerometers and monitoring the decay curves on an oscilloscope. Pictures of the curves were taken with a Polaroid camera. Logarithmic decrements were subsequently calculated from the pictures. The results were compared to numerous creep theories developed from mechanical models. It was concluded that no simple correlation exists between the logarithmic decrement and the ultimate creep of concrete, but the hyperbolic expression proposed by Ross satisfactorily predicts the ultimate specific creep of concrete. (Author)

AD-640 465 See Field 20K

PB-173 272 See Field 13M

11C. COATINGS, COLORANTS, AND FINISHES

AD-640 271 Field 11C
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
THE PERMEATION OF SALT WATER THROUGH ORGANIC PROTECTIVE COATINGS USING RADIOACTIVE TRACER TECHNIQUES.
Progress rept. no. 10, 15 Jun-15 Dec 65,
by A. L. Glass. 15 Dec 65, 16p
Proj. NAEC-AML (17)R360-FR-101
See also AD-433 242.

Descriptors: (*Sea water, Penetration), (*Organic coatings, Permeability), (*Plastic coatings, Permeability), Pigments, Diffusion, Ions, Solubility, pH, Films, Epoxy plastics, Polyamide plastics, Acrylic resins, Cellulosic plastics.

The effect of incorporating a water soluble pigment into an organic protective coating on the diffusion of ions through a film of the material was investigated. Experimental data are presented and expostulations made on the effect of solubility and pH of the pigments on the static charges and structure of polymer films and their effects on diffusion. (Author)

AD-640 435 Field 11C, 15G
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
DEVELOPMENT OF OIL AND FUEL RESISTANT REMOVABLE CAMOUFLAGE COATINGS.
6 May 66, 9p NAEC-AML-2446
Proj. RRMA-03-013/200-1/F020-03-01

Descriptors: (*Camouflage, *Coatings), Plastic paints, Aircraft, Specifications, Pigments, Colors.

An investigation was made to provide technical data for the procurement of the subject coatings in the Field Green, Medium Green, Shadow Green, Desert Drab, and Seaplane Gray colors. These coatings were to be designed so that they could be used over existing aircraft finishes and removed without damage to the latter. The pigments used are as generally listed in Specification MIL-P-6884B. The vehicle for all coatings was acrylic resin, Acryloid B44 (40% solids in toluene).

AD-640 436 Field 11C, 13H, 1C
CFSTI Prices: HC$2.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
THE CORROSION PROTECTION AFFORDED BY VARIOUS COATING SYSTEMS IN AIRCRAFT FASTENER AREAS,
by Jack Ohr. 16 May 66, 27p NAEC-AML-2454
Task RRMA-03-003/200-1/R007-03-01

Descriptors: (*Coatings, Corrosion inhibition), (*Mechanical fasteners, Corrosion inhibition), (*Corrosion inhibition, Naval aircraft), Performance (Engineering), Plastic paints, Epoxy plastics, Acrylic resins, Tests, Isocyanate plastics, Fatigue (Mechanics), Fracture (Mechanics).

A stress-cycling test (at - 103 F and room temperature) designed to simulate the spectrum of stresses which could occur during 500 aircraft flying hours (roughly 1 PAR interval), indicates that current specification and experimental aircraft coatings cannot meet these conditions without cracking around fastener heads. The coatings used were the MIL-C-22750 epoxy, the MIL-L-81352 (WEP) all-acrylic, and two polyurethanes. The implication of this test is that, at the present state of the coatings art, paint films of the non-rubbery type cannot be expected to provide adequate corrosion protection by themselves in the fastener area- a persistent trouble area on naval aircraft. (Author)

N66-29684 Field 11C
CFSTI Prices HC$3.00 MF$0.75
Little (Arthur D.), Inc., Cambridge, Mass.
DEVELOPMENT OF PROTECTIVE FINISHES FOR GLASS MONOFILAMENTS FINAL REPORT.
by H. P. Beutner, S. L. Kaplan, and J. Shulman.
3 Mar 66, 86p NASA-CR-54774, ADL-C-66368
Contract NAS3-4182

Descriptors: *Filament, *Finish, *Glass, *Nickel, *Protective coating, Coating, Composite, Fabrication, Metal, Organic, Protection, Resin, Strength, Tensile.

For abstract, see S 04 16.

N66-36085 Field 11C
CFSTI Prices HC$3.00 MF$0.75
Lockheed-georgia Co., Marietta. Engineering Development Test Labs. Div.
BIREFRINGENT COATINGS FOR NONDESTRUCTIVE TESTING OF HONEYCOMB SANDWICH STRUCTURES FINAL ENGINEERING REPORT NO. 8379, 30 JUN. 1965 - 15 MAR. 1966.
by W. M. Mc gee. Mar 66, 85p NASA-CR-77759
Contract NAS8-11972

Descriptors: *Birefringent coating, *Nondestructive testing, *Sandwich construction, Birefringence, Coating, Construction, Epoxy, Honeycomb, Nondestructive, Panel, Sandwich, Spray, Structure, Testing.

For abstract, see S 04 21.

AD-453 346 See Field 7D

AD-639 922 See Field 11L

AD-640 155 See Field 5E

AD-640 176 See Field 11F

AD-640 437 See Field 7B

11D. COMPOSITE MATERIALS

AD-467 241 Field 11D
CFSTI Prices: HC$4.00 MF$0.75
Materials Advisory Board, NAS-NRC, Washington, D. C.
MICROMECHANICS OF FIBROUS COMPOSITES.
Final rept.
May 65, 124p MAB-207-M
Contract SD-118

Descriptors: (*Composite materials, Mechanics), (*Fibers, Composite materials), Reviews, Theory, Optimization, Design, Engineering, Stresses, Elasticity, Strain (Mechanics), Failure (Mechanics), Tensile properties, Shear stresses, Loading (Mechanics), Creep, Glass, Ceramic materials, Metals, Graphite, Plastics, Thermal properties, Viscosity, Bibliographies, Fracture (Mechanics), Compressive properties, Flexural strength, Stress corrosion.

When external loads or other stress-inducing forces are applied to a composite of fibers embedded in a matrix, internal stresses are set up in each constituent and at the same time complex interactions occur between them. The study of these internal stresses, the internal mechanics of the reactions of the constituents, separately and in concert, to the imposed forces, may be called the micromechanics of fibrous composites. The reasons for theoretical and experimental research in micromechanics are, (1) to clarify the behavior of fibrous composites and thereby to improve the design of engineering structures based on them, and (2) to improve the properties of composites. In this study, the subject is divided into six areas. Certain aspects of each area are treated with respect to the significance of the area, the state of present knowledge (as available to the Committee), the still unanswered questions, and, to the extent possible, suggested lines of attack for research.

N66-28040 **Field 11D**
CFSTI Prices HC$3.00 MF$0.75
Aerojet-general Corp., Azusa, Calif. Von Karman Center.
IMPROVED CRYOGENIC RESIN/GLASS-FILAMENT-WOUND COMPOSITES INTERIM REPORT, 29 JUN. 1965 - 28 MAR. 1966.
by G. E. Bush, J. Creedon, and A. Lewis. May 66, 84p NASA-CR-54867, AEROJET-3196
Contract NAS3-6297

Descriptors: *Composite material, *Cryogenic temperature, *Filament winding, *Reinforcing fiber, *Resin, Composite, Cryogenic, Fiber, Filament, Laminate, Material, Reinforcement, Shear, Strength, Temperature, Testing, Winding.

For abstract, see S 04 15.

N66-29220 **Field 11D**
CFSTI Prices HC$3.00 MF$0.75
Iit Research Inst., Chicago, Ill.
GRAPHITE-METAL CARBIDE COMPOSITES.
by Y. Harada. Jul 66, 70p NASA-CR-507
Contract NASR-65/09/

Descriptors: *Carbide, *Composite material, *Graphite, *Hot pressing, *Metal bonding, Bonding, Composite, Fabrication, Feasibility, Hafnium, High density, High strength, High temperature, Hot, Material, Metal, Microstructure, Molybdenum, Niobium, Physical, Pressing, Pressure, Property.

For abstract, see S 04 16.

N66-29757 **Field 11D**
CFSTI Prices HC$4.00 MF$0.75
Hughes Aircraft Co., Culver City, Calif. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena. Aerospace Group.
STUDY OF THE EFFECTS OF ETHYLENE OXIDE-FREON 12 UPON PROPERTIES OF POLYMERS AND METALLIC SURFACES FINAL REPORT, 10 OCT. 1964 - 31 MAR. 1966.
by A. L. Landis, and R. F. Rydelek. 1966, 101p
NASA-CR-76039, P66-96
Contracts NAS7-100, JPL-951003
Prepared For Jpl

Descriptors: *Ethylene oxide, *Freon 12, *Polymer, *Spacecraft sterilization, *Test program, Compatibility, Electric, Ethylene, Exposure, Mechanical, Mechanism, Oxide, Physical, Program, Spacecraft, Sterilization, Test.

For abstract, see S 04 16.

AD-468 569 **See Field 20K**

AD-640 054 **See Field 11I**

11E. FIBERS AND TEXTILES

AD-640 502 **Field 11E**
CFSTI Prices: HC$7.00 MF$1.75
Clothing and Organic Materials Div., Army Natick Labs., Mass.
DESIGN TABLES FOR TEXTILE FABRICS: TABLES OF SOLUTIONS OF EQUATIONS FOR MAXIMUM WEAVABILITY FABRICS MADE FROM SINGLE FIBER SPECIES AND BLENDS.
Technical rept.,
by Louis I. Weiner. Aug 66, 345p TS-144
Proj. DA-1L013001A91A
USA-NLABS-TR-67-20-CM

Descriptors: (*Textiles, Design), Weaving, Density, Tables, Polyethylene plastics, Stainless steel, Fibers.

The report contains in tabular form the solutions of the maximum weavability equations for the plain, oxford, 3- and 4-harness twills, and 5-harness sateen in terms of warp and filling cover factors and yarn number ratio (Beta) for fabrics made from any fiber species and from blends. The tables are set up for yarn bulk densities ranging from 0.54 to 4.6; this includes fibers as light as polyethylene and as heavy as stainless steel. Supplementary tables are provided giving yarn bulk densities (assuming a standard packing coefficient of 0.59) for all of the commercial fibers and for blends of the most important commercial fibers in increments of 5% ranging from 5% to 95% blend composition. (Author)

11F. METALLURGY AND METALLOGRAPHY

AD 29 766 **Field 11F**
CFSTI Price: HC$5.60
Case Inst. of Tech., Cleveland, Ohio.
LOW TEMPERATURE EMBRITTLEMENT MECHANICS DEDUCED FROM ZINC SINGLE CRYSTAL FRACTURE STUDIES.
Progress rept. no. 1,
by Peter Harlow Morton, and W. M. Baldwin Jr.
1 May 53, 58p
Contract NObs-50303
Projs. SR-111, NS-011-078
SSC-58

Descriptors: (*Zinc, *Embrittlement), Single crystals, Fracture (Mechanics), Low-temperature research, Crystal lattices, Crystal lattice defects, Models (Simulations).

The most important conclusion of this work is that low temperature brittleness in zinc crystals is not due to the cessation of slip below a certain temperature. On the contrary slip is quite active, and it is its activity that induces low temperature brittleness: slip causes rotation of the lattice which in turn sets up orientation gradients adjacent to constricted and unslipped regions. At high temperatures these orientation gradients are accommodated by kink-planes, at low temperatures, by cleavage. These observations are important, for they bear directly on the problem of low temperature brittleness of polycrystalline zinc (because of the orientation gradients always found in polycrystalline metals when deformed) and on the reasons for the lack of low temperature brittleness in face-centered cubic metals (which kink differently from hexagonal close packed crystals). (Author)

AD-453 317 **Field 11F**
CFSTI Price: HC$5.60
Royal Aircraft Establishment, Farnborough (England).
WORK HARDENING OF COPPER CRYSTALS BY CYCLIC STRAINING.
by N. J. Wadsworth, and J. Hutchings. Aug 64, 61p Technical note TN-CPM-78

Descriptors: (*Copper, Single crystals), (*Metallic crystals, Hardening), Cold working, Mechanical working, Strain (Mechanics), Hysteresis, Stresses, Deformation, Temperature, Plasticity, Cryogenics, Great Britain.

Copper single crystals were strained cyclically between constant plastic strain limits. The mechanical hysteresis loops were plotted. The loop shape became constant after a few cycles while the peak stress increased for a few hundred cycles. The effect of sudden changes in temperature or in strain rate on the flow stress was observed and comparison tests were made on similar crystals strained unidirectionally. It is concluded that the frequency factor of the thermally activated process controlling the strain rate is higher in the cyclically hardened crystals. (Author)

AD-453 323 **Field 11F, 20B**
CFSTI Price: HC$3.60
Royal Aircraft Establishment, Farnborough (England).
SLIP BAND EXTRUSION IN FATIGUED CLOSE PACKED HEXAGONAL METALS,
by P. G. Partridge. Aug 64, 33p Rept. no. CPM-12

Descriptors: (*Metals, Fatigue (Mechanics)), Cadmium, Magnesium, Zinc, Crystal structure, Metallic crystals, Deformation, Crystal lattice defects, Theory, Surface properties, Great Britain.

The surface topography produced in fatigued cadmium, zinc, and magnesium polycrystals is described: slip band extrusions occur in cadmium and magnesium but not in zinc. The distribution of the extrusions is related to the dislocation configurations observed in these metals: on the basis of these results a dislocation mechanism involving glissile dislocation dipoles is proposed to account for both extrusions and intrusions in face centred cubic and close packed hexagonal metals. (Author)

AD-464 397 **Field 11F, 20M**
CFSTI Price: HC$1.60
Royal Aircraft Establishment, Farnborough (England).
THE THERMAL EXPANSION OF BETA-SILICON CARBIDE AND SOME TUNGSTEN-MOLYBDENUM ALLOYS.
Technical rept.,
by D. Clark, and D. Knight. Mar 65, 13p TR-65049

Descriptors: (*Tungsten alloys, Thermal expansion), (*Molybdenum alloys, Thermal expansion), (*Carbides, Thermal expansion), Silicon compounds, X-ray diffraction analysis, Molybdenum, Tungsten, Crystal lattices, Refractory coatings, Compatibility, Refractory metals, Great Britain, Crystal structure, Protective treatments.

Identifiers: Silicon carbides.

Thermal expansion coefficients of some tungsten-molybdenum alloys were determined by X-ray diffraction methods over the temperature range 25 to 1200 C. Within experimental error the coefficients are independent of temperature over the range studied. Beta-silicon carbide was also investigated. Values of the mean expansion coefficient 0.00000594 are tabulated. (Author)

AD-469 954 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
British Non-Ferrous Metals Research Association, London (England).

SURFACE TREATMENT OF TITANIUM ALLOYS: A REVIEW OF PUBLISHED INFORMATION,
by N. J. Finch, and J. E. Bowers. May 65, 19p
Research rept. A-1536, S/T memo-9/65

Descriptors: (*Titanium alloys, Surfaces), (*Surfaces, Protective treatments), Wear resistance, Optimization, Lubricants, Friction, Reviews, Plating, Chromium, Adhesion, Nickel, Coating, Sprays, Metals, Nickel alloys, Iron alloys, Cobalt alloys, Molybdenum, Plasma jets, Refractory materials, Vapor plating, Plastic coatings, Surface properties.

The report reviews the use of lubricants and surface coatings to improve the wear and galling resistance of titanium alloys. The methods of coating discussed are anodic oxidation, plating, metal spraying, deposition from a vapour phase, diffusion treatments with gases and in active salt baths, metallic diffusion coatings, surface hardening by heat treatment, chemical conversion coatings and plastic coatings. It is concluded that the most important criteria for a coating for highly stressed components with heavy surface loads are: (1) wear and galling resistance must be good; (2) strong adhesion between coating and substrate must be achieved; (3) the coating must withstand high loads and sliding forces, and (4) mechanical properties of the underlying titanium alloy should not be impaired by the coating. (Author)

AD-470 843 **Field 11F**
CFSTI Prices: HC$3.60 MF$0.50
New York Univ., N. Y. School of Engineering and Science.
DEVELOPMENT OF TOUGH, HIGH STRENGTH ALPHA-BETA TITANIUM-BASE ALLOYS AT 240,000-260,000 PSI YIELD STRENGTH LEVEL.
Quarterly progress rept. no. 9, 26 Jun-25 Sep 64,
by P. A. Farrar, and H. Margolin. 25 Sep 64, 40p
Contract DA-30-069-ORD-3690
Proj. DA-59332008
WAL-TR-401/308-8
See also AD-431 680, AD-609 905.

Descriptors: (*Titanium alloys, Mechanical properties), Ductilities, Tensile properties, Impact shock, Welding, Heat treatment, Fracture (Mechanics), Data, Tables.

Identifiers: Titanium alloy 6AL 5V, Titanium alloy.

In order to develop titanium alloys with higher ductilities and 0.1% yield strengths in the range of 190,000 to 240,000 psi and usable ductility in the range from 240,000 to 260,000 psi, 30 eight pound ingots were investigated and an additional 26 eight pound ingots are now being evaluated as part of Phase II. The data on 9 ingots from this second group is included in this report. Four alloys which showed promising properties in the 190,000-240,000 psi range as 8 lb. ingots were remelted as 80 lb. ingots for further evaluation as bar, plate and sheet material. Tensile tests at room temperature and -40 F impact tests have been completed on the bar stock and the plate for the four ingots. Welding experiments have been completed on the sheet and the data included herein. (Author)

AD-472 103 **Field 11F, 13H**
CFSTI Prices: HC$1.10 MF$0.50
Martin Co., Denver, Colo.
CENTER FOR HIGH ENERGY RATE FORMING PROCESSES.
Quarterly rept.
1965, 10p Martin-CR-65-77
See also AD-635 486 and AD-635 572.

Descriptors: (*Metals, Material forming), (*Material forming, Metals), Research program administration, Explosive forming, Hardening, Tensile properties, Mechanical properties, Energy, Strain (Mechanics), Buckling (Mechanics), Joining, Deformation.

Active work has been going on over the past ten years in the field of High Energy Rate Forming of Metals, but the full potential of this process has yet to be realized. More than one large-scale program has resulted in failure as a result of trying to extrapolate empirical knowledge too far without making adequate use of the body of scientific knowledge that exists. The Center for High Energy Rate Forming Processes has been established for the purpose of bringing about a coupling of science and technology in this field. (Author)

AD-476 684 **Field 11F, 13J, 20K**
CFSTI Prices: HC$3.00 MF$0.75
Ship Structure Committee, Washington, D. C.
STUDIES OF SOME BRITTLE FRACTURE CONCEPTS.
Final rept.,
by R. N. Wright, W. J. Hall, S. W. Terry, W. D. Nordell, and G. R. Erhard.Sep 65, 94p SSC-170
Proj. SR-163
Prepared in cooperation with Illinois Univ., Urbana, Contract NObs-86688.

Descriptors: (*Steel, *Fracture (Mechanics)), Ship hulls, Ship structural components, Welds, Stresses, Brittleness, Ship plates, Toughness, Elasticity, Bibliographies.

Interpretive studies based on available information on the low-stress brittle fracture behavior of mild steel are made to suggest additional guides for the evaluation of the fracture resistance of fabricated steel structures. An experimental investigation was conducted to investigate the influence of welding on the yield behavior of metal from the thermally affected zone in the vicinity of a weld. The study suggests that low-stress cleavage initiation at service temperatures can be associated with a marked local reduction of critical fracture stress, that residual stresses can be responsible for the propagation through sound metal of fractures initiated in damaged material, and that the critical fracture stress and fracture mechanics approaches are equivalent when applied to cleavage propagation and arrest.

AD-639 663 **Field 11F, 20B, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Army Materials Research Agency, Watertown, Mass.
THE LATTICE PARAMETERS AND SOLUBILITY LIMITS OF ALPHA IRON AS AFFECTED BY SOME BINARY TRANSITION-ELEMENT ADDITIONS.
Technical rept.,
by Ernest P. Abrahamson II, and Stanley L. Lopata. Aug 66, 31p AMRA-TR-66-25
Proj. DA-1C024401A110

Descriptors: (*Iron alloys, *Crystal lattices), Solubility, Solid solutions, Crystal structure, X-ray diffraction analysis, Transition elements, Phase studies.

The lattice parameters of alpha iron with binary additions of all the transition metals, except technetium, have been accurately determined on solid samples. No direct correlation with solute size is observed, but an effect of electron configuration is noted. The solubility limits of alpha iron with Ti, Cu, Zr, Nb, Mo, Hf, Ta, and W were determined at 600, 700, 800, and 900 C. (Authors)

AD-639 666 **Field 11F, 20K**
CFSTI Prices: HC$1.00 MF$0.50
Illinois Univ., Urbana. Dept. of Theoretical and Applied Mechanics.
AN INVESTIGATION OF THE INFLUENCE OF RESIDUAL STRESSES AND HETEROGENEOUS YIELDING ON BRITTLE FRACTURE.
Final rept. 15 Jun 61-30 Apr 64,
by H. T. Corten. Sep 66, 4p
Contract DA-31-124-ARO (D)-66
Proj. DA-200105-01-B-700
AROD-3216:3

Descriptors: (*Steel, *Fracture (Mechanics)), Stresses, Toughness, Brittleness, Deformation, Measurement.

The problem of brittle fracture at low stresses in mild steel was separated into three phases: (a) measurement of fracture toughness for initial crack extension from an artificial (fatigue) crack using concepts of linear elastic fracture mechanics, (b) measurement of fracture toughness for a running crack and for crack arrest, and (c) measurement of the reduction in fracture toughness for initial crack extension caused by one or a combination of embrittling factors including residual welding stresses, heat affected zone, compressive prestrain, hydrogen, irradiation and possibly certain atmospheres. (Author)

AD-639 668 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana. Dept. of Theoretical and Applied Mechanics.
MECHANISMS OF ENVIRONMENT INDUCED SUBCRITICAL FLAW GROWTH IN AISI 434 STEEL.
Interim technical rept.,
by William Alan Van Der Sluys. Sep 66, 47p TAM-292
Contract DA-31-124-ARO (D)-378
Proj. DA-20014501B320
AROD-5612:1

Descriptors: (*Steel, *Fracture (Mechanics)), Hydrogen embrittlement, Corrosion, Embrittlement, Environmental tests, Stress corrosion, Liquid immersion tests, Water.

Identifiers: Steel 4340.

Results of an experiment designed to study the effect of several variables on subcritical crack growth rate of a high-strength steel in a water environment are presented. Environmental variables included temperature, pH of the liquid environment, electric charging, and the combined effect of pH and electric charging. Tapered double cantilever beam specimens were designed so that the level was maintained constant at a constant load and independent of crack length. Thus steady-state crack growth measurements were possible in constant load and constant environment experiments. With this specimen design, it was possible to make a series of measurements that covered the entire range of effects of a particular variable using only one specimen. (Author)

AD-639 860 **Field 11F, 7D**
Not available from CFSTI.
Sheffield Univ. (England). Dept. of Physics.
MICROWAVE RESONANCE OBSERVATIONS IN GADOLINIUM SOLID SOLUTIONS.
Revised ed.,
by A. M. Harris, J. Popplewell, and R. S. Tebble. 17 Mar 66, 8p
Grant AF-EOAR-60-65
Proj. AF-9763
Task 976303
AFOSR-66-1734
Revision of manuscript submitted 8 Feb 66.
Availability: Published in Proceedings of the Physical Society v88 p679-83 1966.

Descriptors: (*Gadolinium alloys, Resonance), (*Magnetic materials, Gadolinium alloys), Microwave spectroscopy, Solid solutions, Measurement, Lanthanum compounds, Yttrium compounds, Scandium compounds, Lutecium compounds, Great Britain.

Microwave resonance measurements have been made on a number of paramagnetic, ferromagnetic and antiferromagnetic Gd-Lu, Gd-Y, Gd-Sc and Gd-La alloys. A paramagnetic value for g = 1.990 plus or minus 0.005 has been obtained for those Gd-Y alloys containing small concentrations of gadolinium and close to the free-ion value: g = 1.995 plus or minus 0.010 for dilute alloys of gadolinium in scandium or lanthanum. These values compare with a value for g = 2.010 plus or minus

0.010 reported by Harris et al. in 1965 for Gd-Lu alloys of similar gadolinium content. In all alloys examined the g factor increases as the gadolinium content of the alloy decreases. The resonance line intensity of the Gd-Y and Gd-Lu alloys falls rapidly on cooling below the Neel temperature and observations have been made well into the spiral-spin region. As with ferromagnetic observations there is some uncertainty as to the factors influencing the absorption and so interpretation of these lines is made. (Author)

AD-639 875 **Field 11F, 20L**
Not available from CFSTI.
Westinghouse Research Labs., Pittsburgh, Pa.
INELASTIC IMPURITY SCATTERING OF ELECTRONS IN GOLD ALLOYS AT LOW TEMPERATURES,
by D. H. Damon, and P. G. Klemens. 1966, 7p
Contract AF 49 (638)-1165
Proj. AF-9763
Task 976302
AFOSR-66-1651
Availability: Published in Low Temperature Physics-LT9 ptB p996-1000 1965.

Descriptors: (*Gold alloys, Cryogenics), Copper alloys, Platinum alloys, Impurities, Scattering, Electrons, Crystal structure, Thermal stresses.

The electrical resistivity of some binary gold alloys with copper and platinum was measured from 1.5 to 40K, in order to study deviations from Matthiessen's rule and to investigate a possible contribution of phonon-assisted impurity scattering to the resistance. This process was originally suggested by Koshino, who ascribed it to the perturbing effect of the displacement of the impurity potential by a lattice wave. This was criticized by Taylor who showed that the displacement perturbation could be transformed away, leaving only a small residual effect on the resistivity. However, there is a further effect arising from the strain on the impurity site due to a lattice wave, which should also lead to phonon-assisted scattering, and to an additional resistance of the form Delta rho = A rho sub o (epsilon squared) = beta (T) rho sub o where rho sub o is the residual resistivity, A a numerical constant, and alpha the meansquare thermal strain, so that B (T) T (4) at low temperatures. (Author)

AD-639 944 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Pitman-Dunn Research Labs., Frankford Arsenal, Philadelphia, Pa.
PLANE STRAIN FRACTURE TOUGHNESS OF 2219-T87 ALUMINUM ALLOY AT ROOM AND CRYOGENIC TEMPERATURES.
Technical research rept.,
by Carl M. Carman, John W. Forney, and Jesse M. Katlin. Aug 66, 40p
NASA-CR-54297, FA-R-1821

Descriptors: (*Aluminum alloys, Toughness), Fracture (Mechanics), Cryogenics, Tensile properties.

Identifiers: Aluminum alloy 2219.

The tensile properties and plane strain fracture toughness of 1/2 and 1 inch thick 2219-T87 aluminum alloy were determined as a function of testing at temperatures from room to -423 F. The tensile and yield strengths of this material show a gradual increase as the testing temperature is decreased to -423 F while the elongation and reduction of area remain essentially unchanged. The plane strain fracture toughness of this material is relatively insensitive to testing temperature and shows only a slight increase with decreasing testing temperature. Specimens machined so that the crack propagation is perpendicular to the rolling plane show somewhat higher values of plane strain fracture toughness than when crack propagation is parallel to the rolling plane. The plane strain fracture toughness of the 1 inch thick 2219-T87 aluminum alloy was somewhat lower than that of the 1/2 inch thick plate. Illustrative examples are presented on using these parameters in design. (Author)

AD-639 950 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Army Weapons Command, Rock Island, Ill. Research and Engineering Div.
THE EFFECT OF HYDROGEN IN END-CHILLED CAST PLATES OF A356 ALUMINUM ALLOY.
Technical rept.,
by Richard B. Miclot. Aug 66, 18p
Proj. DA-1L013001A91A
R1A-66-2516

Descriptors: (*Aluminum alloys, Castings), Hydrogen, Metal plates, Mechanical properties.

The report summarizes the results of tests for hydrogen content, mechanical properties, and solidification rates in end-chilled cast plates of A356 aluminum alloy. Drastically chilled regions of castings exhibit lower hydrogen content than underriser sections. Lower tensile strength and elongation in castings are obtained with higher hydrogen content in either chilled or slowly solidified parts. Yield strength is not severely impaired in directionally fed sections of cast plates from gassed melts even at remote distances from a chill. (Author)

AD-640 172 **Field 11F, 20M**
CFSTI Prices: HC$4.00 MF$0.75
Yale Univ., New Haven, Conn. Kline Geology Lab.
COMPRESSION OF MERCURY TO HIGH PRESSURE.
Technical rept.,
by Lance Alan Davis. 1966, 105p TR-8
Contract Nonr-609 (44)
Proj. RR-007-01-01
Doctoral thesis.

Descriptors: (*Mercury, Volume), High-pressure research, Compressive properties, Ultrasonic radiation, Liquid metals, Phase studies, Equations of state.

A method for calculating volume results from high pressure acoustic data was developed which is not limited to small compressions by the assumption of a constant ratio of isothermal to adiabatic compressibility. This method thereby extends the useful range of the ultrasonic technique for determining compression data. In order to demonstrate the technique, high pressure sonic velocity experiments were performed as a function of temperature on liquid mercury. The apparatus and techniques necessary for determining the velocity of sound in the Hg and for generating and measuring high pressures were developed. A variant of the pulse-echo technique was used to determine the sonic velocity. A supported cylinder-and -piston pressure apparatus was constructed which is capable of attaining pressures of about 25kb. The Hg sample was held in a small stainless steel container which was inserted in the 1 in. bore of the pressure vessel. Pressure was determined by monitoring the resistance of a coil of Au - 2.1% Cr wire which was calibrated for pressure against a dead weight tester. The volume data obtained were analyzed to determine the functional form of the equation of state of liquid Hg. It is found that the equation of state is most appropriately written as an expansion of P either in terms of V sub zero/V or in terms of lnV. (Author)

AD-640 176 **Field 11F, 11C**
CFSTI Prices: HC$2.00 MF$0.50
Rock Island Arsenal, Ill.
HYDROGEN EMBRITTLEMENT OF STEEL IN METAL FINISHING PROCESSES OF BLACK OXIDE AND ZINC PHOSPHATIZE.
Technical rept.,
by R. H. Wolff. Jun 66, 27p TR-66-2008
Proj. 56228

Descriptors: (*Steel, Hydrogen embrittlement), (*Coatings, Steel), Oxides, Zinc compounds, Phosphate coatings, Tensile properties.

Static load tests were conducted with notched, steel tensile specimens after processing in black oxide (specification MIL-C-13924 Class 1) and also after processing in zinc phosphatize solution (specification MIL-P-16232C Type Z), to determine embrittlement characteristics of these processes. The scope of work was limited to a brief survey to determine whether the problem was serious for these processes. Results based on the use of types 4140, 1045 and 1095 steel specimens at hardness of Rockwell C 50 show that embrittlement is not a problem with the black oxide process. The zinc phosphatize process is critically embrittling, and relief treatment for higher strength steels is advisable. (Author)

AD-640 229 **Field 11F**
CFSTI Prices: HC$4.00 MF$0.75
Boeing Scientific Research Labs., Seattle, Wash.
STRESS CORROSION CRACKING OF TITANIUM ALLOYS PRELIMINARY REPORT ON Ti:8Al-1Mo-1V ALLOY AND PROPOSED ELECTROCHEMICAL MECHANISM,
by T. R. Beck. Jul 66, 111p D1-82-0554
Also available from the author.

Descriptors: (*Titanium alloys, *Stress corrosion), Fracture (Mechanics), Aluminum alloys, Molybdenum alloys, Vanadium alloys, Electrochemistry, Cathodic protection, Voltage.

Identifiers: Titanium alloy 8Al 1Mo 1V.

Stress corrosion cracking of titanium: 8% Al - 1% Mo - 1% V alloy specimens was investigated in various salt solutions at controlled potentials applied by a potentiostat. Polarization curves on titanium oxide surfaces and kinetic data for oxidation of newly formed titanium alloy surface were also obtained. It was found that stress corrosion cracking of duplex annealed Ti:8-1-1 alloy occurred in chloride, bromide, and iodide solutions but did not occur in other solutions such as fluoride, hydroxide, sulfide, sulfate, nitrate or perchlorate. The ultimate strength was strongly dependent upon potential. The velocity of crack propagation and current flowing into the crack in chloride, bromide and iodide solutions were linearly related to the applied potential above a potential of -900 mv to the saturated colomel electrode. An electrochemical model was developed to interpret the data. Anodic reaction with the halides is considered to initiate at the -900 mv potential and the rate of crack propagation to be limited by the potential drop through the electrolyte in the crack. It is planned to extend the investigation to other alloys using the model as a guide for the design of experiments. (Author)

AD-640 287 **Field 11F, 20K**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
STUDYING CYCLIC STRENGTH OF METALS BY THE METHOD OF RECORDING FATIGUE DIAGRAMS,
by T. A. Lebedev, T. K. Marinets, and A. I. Efremov. 29 Apr 66, 14p FTD-TT-65-1402
TT-66-62429
Unedited rough draft trans. of Akademiya Nauk SSSR. Institut Metallurgii, Moscow. Trudy, n9 p141-6 1962.

Descriptors: (*Metals, Fatigue (Mechanics)), Graphics, USSR, Copper, Iron, Titanium alloys, Fracture (Mechanics), Test methods.

Conclusions: By recording the fatigue diagram of samples tested under the effect of cyclic loads, an indirect representation can be obtained of when fatigue of metals appears and the formation of fatigue fracture does take place. It therefore appears advisable to carry out an investigation of fatigue

strength of metals by the proposed method on a much wider circle of materials.

AD-640 310 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
RADIATION CAPACITY OF SOME INDUSTRIAL ALLOYS IN THE INFRARED RANGE OF THE SPECTRUM,
by V. V. Lebedeva, and V. K. Novik. 13 Apr 66, 11p FTD-TT-65-1796
TT-66-62445
Unedited rough draft trans. of Akademiya Nauk SSSR. Izvestiya. Metallurgiya i Gornoe Delo. n4 p143-6 1964.

Descriptors: (*Alloys, Emissivity), USSR, Monochromatic light, Infrared radiation, Measurement, Steel, Aluminum alloys, Brass.

An investigation was made of the radiation capacity of the aluminum alloys AD1 and D16 at the temperature of 100 - 400 C, and also of brass L62 and the steels St. 3 and St. 45 at temperatures of 100 - 650 C in the infrared region of the spectrum with the long waves of the length wavelength = 2 - 14 microns. The results of the investigations and the values obtained for the monochromatic radiation capacity of a number of alloys under various conditions enables the selection of receivers of radiation in accordance with their spectra and power properties, as well as providing the possibility of computing the designs and elements of the optical tract of the checking and measuring instruments.

AD-640 345 **Field 11F**
Not available from CFSTI.
Army Biological Labs., Frederick, Md.
DIRECT EVIDENCE FOR THE CATHODIC DEPLOLARIZATION THEORY OF BACTERIAL CORROSION,
by Warren P. Iverson. 17 Jan 66, 2p
Availability: Published in Science v151 n3713 p986-8 Feb 25 1966.

Descriptors: (*Corrosion, *Bacteria), Spirillaceae, Polarization, Steel, Aluminum alloys.

Cathodic depolarization of mild steel by Desulfovibrio desulfuricans was demonstrated with benzyl viologen used as an electron acceptor. Direct measurement of the cathodic depolarization current indicated a maximum current density of 1 microampere per square centimeter. Aluminum alloys were also cathodically depolarized by the organism. (Author)

AD-640 369 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
DYNAMIC TESTS OF STRUCTURAL ALUMINUM ALLOYS.
Technical rept.,
by W. L. Cowell. Sep 66, 28p TR-R-478
Proj. Y-F008-08-03-401
DASA-13.0181

Descriptors: (*Aluminum alloys, Strain (Mechanics)), Stresses, Tensile properties, Mechanical properties.

Identifiers: Aluminum alloy 6061, Aluminum 6063, Aluminum alloy 5456.

A series of dynamic tests was conducted on three grades of structural aluminum alloys: (a) 6061-T6, (b) 6063-T5, and (c) 5456-H321. The effects of strain rate on the mechanical properties of these materials were obtained. In the elastic range of the material tested, the strain rate ranged from a static value of 0.000022 in./in./sec to a maximum value of 2.5 in./in./sec. The mechanical properties of the alloys showed a variety of changes when subjected to high strain rates. The 6061-T6 aluminum increased 5% and 10.6% over the static value for yield stress and tensile strength, respectively, at the maximum test rates. The 6063-T5 aluminum showed no change in yield stress and a 5.8% increase in tensile strength at the maximum test rate. The 5456-H321 aluminum was obtained in plate form, and specimens were prepared with their longitudinal axes both parallel and perpendicular to the direction of rolling. The yield stress for specimens prepared parallel to the direction of rolling decreased 3.6%, and the yield stress for specimens prepared perpendicular to the direction of rolling increased 2.5% at the maximum test rate. The direction of rolling did not affect the tensile strength behavior under rapid testing since both groups of 5456-H321 alloy exhibited an average reduction of 5.7% in tensile strength at the maximum test rate. None of the changes in mechanical properties are believed to be of sufficient magnitude to be of concern in design. (Author)

AD-640 370 **Field 11F, 13H, 5A**
CFSTI Prices: HC$7.30 MF$2.00
Comision Nacional de Energia Atomica, Buenos Aires (Argentina). Dept. de Metalurgia.
PRIMERA CONFERENCIA DE EXPERTOS LATINOAMERICANOS EN METALURGIA DE TRANSFORMACION. VOLUMEN I, BUENOS AIRES, 18-23 AGOSTO, 1964 (First Latin American Conference on Process Metallurgy and Metal Working. Volume I, Buenos Aires, August 18-23, 1964).
1966, 431p
Grant AF-AFOSR-717-65
AFOSR-66-2001-Vol-1
See also AD-640 371.

Descriptors: (*Metallurgy, *Symposia), (*Material forming, Metallurgy), Steel, Welding, Refractory metals, Cold working, Compacting, Aluminum, Aluminum alloys, Iron alloys, Silicon alloys, Castings, Hardness.

Contents: 'Some recent developments in engineering materials and processes'; 'Development and plan of activities of the casting laboratory at the Metals Department of the Chemistry and Technology Institute of the School of Engineering of the University of Uruguay'; 'The Technological Research Institute of Sao Paulo and its contributions to the development of metallurgy in Brazil'; 'Plan of activities of the department of metallurgy of the CNEA'; 'Plan of activities of the service of technical assistance to industry (SATI)'; 'A review of the metallurgical research activities in Chile'; 'Some remarks on the physical metallurgy of iron and steel'; 'New American ultrahigh-strength steels'; 'Rationalized use of constructional steels'; 'Cellular metallic materials'; 'Steel weldability criteria'; 'Problems and developments in primary processing of refractory metals'; 'Cold compaction of aluminum and aluminum base alloys'; 'Hardenability of constructional steel'; 'High-silicon iron castings, of high corrosion resistance, for chemical plants'.

AD-640 371 **Field 11F, 13H, 5A**
CFSTI Prices: HC$7.10 MF$1.75
Comision Nacional de Energia Atomica, Buenos Aires (Argentina). Dept. de Metalurgia.
PRIMERA CONFERENCIA DE EXPERTOS LATINOAMERICANOS EN METALURGIA DE TRANSFORMACION. VOLUMEN II, BUENOS AIRES, 18-23 AGOSTO, 1964 (First Latin American Conference on Process Metallurgy and Metal Working. Volume II, Buenos Aires, 18-23 August, 1964).
1966, 406p
Grant AF-AFOSR-717-65
AFOSR-66-2001-Vol-2
See also AD-640 370.

Descriptors: (*Metallurgy, Symposia), (*Material forming, Metallurgy), Corrosion, Manufacturing methods, Metal plates, Refining (Metallurgy), Copper, Brass, Molding materials, Sand, Mechanical working, Welding rods, Sheets, Explosive forming, Casting, Aluminum, Bonding, Fatigue (Mechanics).

Contents: 'Some problems related to the corrosion of metals'; 'Fabrication of porous plates'; 'A new theory to calculate forces in metal forming operations'; 'Fire-refining process and other solutions to problems arisen from impurities in alpha cu and brass'; 'Determination of residual properties of foundry sands'; 'Some aspects of metal forming'; 'Tri-service coordinated metal working and processing program'; 'Some technical aspects of the United States metalworking, processes and equipment program (M.P.E.P.)'; 'Materials research in support of advanced technology'; 'Production of copper-cobalt-silicon rotating seam-welding electrodes'; 'Fabrication and properties of a high resistance to softening and high conductivity copper alloy'; 'Non ferrous metal sheet manufacturing'; 'Design optimization through materials research'; 'Explosive working of metals'; 'New metal manufacturing processes in the USA of possible application in Latin American countries'; 'Continuous casting of aluminum'; 'Roll-bonding of metals'; 'The effect of size and shape on the fatigue strength of structural and machine members'; 'Strategy of metallurgical research on Latin America'; 'Objectives of regional collaboration on technological searching'.

AD-640 402 **Field 11F, 8A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Naval Applied Science Lab., Brooklyn, N. Y.
BIBLIOGRAPHY ON MICROBIOLOGICAL CORROSION (DEEP SEA).
Technical memo.,
11 Jun 65, 25p TM-1
Projs. SR-004-03-01, 9400-72
Task 0589

Descriptors: (*Corrosion, Microbiology), Bibliographies, Deep submergence, Bacteria, Corrosion inhibition, Marine biology, Microorganisms, Degradation.

The bibliography covers the significant literature on marine microorganisms known to be effective in promoting corrosion and deterioration of materials, with particular reference to microorganisms found in the ocean depths. Brief comments are included for each reference cited except for those significant articles which were not readily obtainable. Papers concerning the effects on high hydrostatic pressures and low ambient temperatures of the ocean depths on the enzymatic mechanisms of certain microbial species are listed for reference in future work along these lines in conjunction with deterioration and corrosion. (Author)

AD-640 477 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
DIRECT HEATING RELAXER,
by L. N. Aleksandrov, and V. S. Mordyuk. 30 Mar 66, 14p FTD-TT-65-1637
TT-66-62461
Unedited rough draft trans. of Mono. Vsesoyuznaya Konferentsiya po Relaksatsionnym Yavleniyam v Metallakh i Splavakh (no. 3) Voronezh, 1962. Relaksatsionnye Yavleniya v Metallakh i Splavakh, Trudy Konferentsii, Moscow 1963, p65-71.

Descriptors: (*Induction heating, *Metals), Annealing, Friction, Tungsten, Temperature, Reduction, USSR.

ANL-7088 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
SAMPLING OF LIQUID METALS,
by I. O. Winsch, K. R. Tobias, R. D. Pierce, and L. Burris Jr. Sep 65, 17p
Contract W-31-109-eng-38

Descriptors: (*Liquid metals, *Quality control).

For abstract, see N 20 20.

ANL-7135 Field 11F
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
THE BETA YIELDS ALPHA TRANSFORMATION IN HIGH-PURITY PLUTONIUM,
by M. Rosen, R. G. Peterson, and L. T. Lloyd.
Feb 66, 87p
Contract W-31-109-eng-38

Descriptors: (*Plutonium, Phase studies).

For abstract, see N 20 19.

ANL-7182 Field 11F, 20H
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
USE OF NUCLEAR NULL-MATRIX IN NEUTRON-DIFFRACTION STUDIES,
by S. S. Sidhu, Leroy Heaton, M. H. Mueller, and D. D. Zauberis. Mar 66, 25p
Contract W-31-109-eng-38

Descriptors: (*Neutron diffraction analysis, Nuclear scattering).

For abstract, see N 20 19.

DP-1008 Field 11F
CFSTI Prices: HC$2.00 MF$0.50
Du Pont De Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
THE ROLE OF DISLOCATIONS IN TRANSGRANULAR STRESS-CORROSION CRACKING OF AUSTENITIC STAINLESS STEELS,
by McIntyre R. Louthan, Jr. Mar 66, 26p
Contract AT (07-2)-1

Descriptors: (*Stainless steel, *Corrosion research).

For abstract, see N 20 19.

DP-1023 Field 11F, 18G
CFSTI Prices: HC$2.00 MF$0.50
Du Pont De Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
STRESS-CORROSION CRACKING OF CARBON STEEL IN SIMULATED WASTE SOLUTIONS.
by L. P. Costas, M. L. Holzworth, and W. C. Rion. Jun 66, 33p
Contract AT (07-2)-1

Descriptors: (*Steel, *Corrosion research), (*Radioactive waste, Storage tanks).

For abstract, see N 20 19.

N66-27072 Field 11F
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
OXIDATION AND EMBRITTLEMENT IN SILICIDE-COATED COLUMBIUM-ALLOY AND ALUMINIDE-COATED TANTALUM- ALLOY SHEET.
by W. B. Lisagor, and B. A. Stein. 1965, 19p
NASA-TM-X-56813
Presented At The Met. Soc. Of Aime 4th Symp. On Refractory Metals, French Lick, Ind., 3-5 Oct. 1965

Descriptors: *Embrittlement, *Niobium alloy, *Oxidation, *Tantalum alloy, Alloy, Aluminum, Coating, Dynamic, Mechanical, Metallurgy, Niobium, Property, Resistance, Sheet, Silicide, Static, Tantalum, Test, Titanium, Tungsten, Zirconium.

For abstract, see S 04 15.

N66-27077 Field 11F
CFSTI Prices HC$3.00 MF$0.50
American Machine And Foundry Co., Alexandria, Va. Materials Dept.
DEVELOPMENT OF LIGHT WEIGHT MAGNESIUM ALLOYS FOR LOW TEMPERATURE APPLICATIONS ANNUAL PROGRESS REPORT, 19 JUN. 1964 - 18 JUN. 1965.
by H. F. Develin, G. Di giovanni, F. J. Dunkerley, E. P. Flint, and H. W. Leavenworth Jr. 15 Jul 65, 53p NASA-CR-64249
Contract NAS8-11168

Descriptors: *Magnesium alloy, *Metallurgy, development of light weight magnesium alloys for low temperature applications annual progress report, 19 jun. 1964 - 18 jun. 1965..

For abstract, see S 04 15.

N66-27318 Field 11F
CFSTI Prices HC$3.00 MF$0.75
Trw Equipment Labs., Cleveland, Ohio. Materials Research And Development Dept.
GENERATION OF LONG TIME CREEP DATA OF REFRACTORY ALLOYS AT ELEVATED TEMPERATURES ELEVENTH QUARTERLY REPORT, 26 DEC. 1965 - 26 MAR. 1966.
by J. C. Sawyer, and E. A. Steigerwald. 15 Apr 66, 94p NASA-CR-54973
Contract NAS3-2545

Descriptors: *Creep analysis, *Metallurgy, *Refractory metal, Alloy, Analysis, Arc, Base, Columbium, Creep, Elongation, High temperature, Metal, Molybdenum, Refractory, Stress, Tantalum, Tungsten, Vapor.

For abstract, see S 04 15.

N66-27743 Field 11F
CFSTI Prices HC$2.00 MF$0.75
Westinghouse Electric Corp., Pittsburgh, Pa. Astronuclear Lab.
DETERMINATION OF THE WELDABILITY AND ELEVATED TEMPERATURE STABILITY OF REFRACTORY METAL ALLOYS TENTH QUARTERLY REPORT, 21 SEP. - 20 DEC. 1965.
by G. G. Lessmann, and D. R. Stoner. 1965, 30p NASA-CR-54975, WANL-PR-/P/-010
Contract NAS3-2540

Descriptors: *Alkali metal, *High temperature alloy, *Power supply, *Refractory alloy, *Welding, Alkali, Alloy, Electric, High temperature, Metal, Power, Refractory, Space, Stability, Supply, System.

For abstract, see S 04 15.

N66-27744 Field 11F
CFSTI Prices HC$2.00 MF$0.50
Trw Equipment Labs., Cleveland, Ohio.
DETERMINATION OF ELEVATED TEMPERATURE FATIGUE DATA ON REFRACTORY ALLOYS IN ULTRA-HIGH VACUUM SEVENTH QUARTERLY REPORT, 1 JAN. - 1 APR. 1966.
by C. R. Honeycutt, and J. C. Sawyer. 15 Apr 66, 37p NASA-CR-54983
Contract NAS3-6010

Descriptors: *High temperature alloy, *Metal fatigue, *Refractory alloy, *Ultrahigh vacuum, Alloy, Creep, Environment, Fatigue, High temperature, Metal, Power, Refractory, Space, Stress, System, Turbine, Ultrahigh, Vacuum.

For abstract, see S 04 15.

N66-28080 Field 11F
CFSTI Prices HC$2.00 MF$0.50
Washington Univ., Seattle.
X-RAY ANALYSIS OF FATIGUE DAMAGE IN COPPER.
by R. G. Baggerly. 1966, 49p NASA-CR-75754
Grant NSG-484

Descriptors: *Copper, *Fatigue test, *Strain fatigue, *X-ray analysis, Analysis, Coherent, Crystal, Diffraction, Domain, Fatigue, Hardening, Lattice, Mean, Root, Size, Square, Strain, Structure, Test, X-ray.

For abstract, see S 04 15.

N66-28369 Field 11FField 22M
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
THE PHENOMENON OF DIMERIZATION OF ALKALI METAL VAPORS AND CALCULATION OF THEIR THERMOPHYSICAL PROPERTIES TO A TEMPERATURE OF 1500 DEG C.
Yavleniye Dimerizatsii V Parakh Shchelochnykh Metallov I Raschet Ikh Teplofizicheskikh Svoystv Do Temperatury 1500 Deg. C
by L. D. Volyak. May 66, 15p NASA-TT-F-10159
Transl. Into English From Inzh.-fiz. Zh. (Ussr), V. 5, No. 3, 1962 P 51-58

Descriptors: *Alkali metal, *Metal vapor, *Thermophysical property, Alkali, Deflection, Diatomic, Dimerization, Field, Gas, Magnetic, Metal, Mixture, Monatomic, Property, Sodium, Thermophysical, Vapor.

For abstract, see S 04 15.

N66-28512 Field 11F
CFSTI Prices HC$1.00 MF$0.50
Battelle-northwest, Richland, Wash. Pacific Northwest Lab.
A STUDY OF TUNGSTEN-TECHNETIUM ALLOYS QUARTERLY PROGRESS REPORT, OCT. 1, 1965 - JAN. 1, 1966.
3 Jan 66, 15p NASA-CR-75541, BNWL-196
Contract AT/45-1/-1830
Sponsored By Nasa

Descriptors: *Metallurgy, *Technetium, *Tungsten alloy, Alloy, Arc, Beam, Cast, Density, Electron, Fracture, Grain, Hot, Measurement, Melting, Roll, Structure, Surface, Tungsten.

For abstract, see S 04 16.

N66-28519 Field 11F
CFSTI Prices HC$1.00 MF$0.50
Pittsburgh Univ., Pa.
A NUMERICAL ANALYSIS OF HYSTERESIS AND EDDY CURRENT LOSSES IN SOLID CYLINDRICAL RODS OF 1010 STEEL.
by M. D. Abrams, and D. H. Gillott. 1966, 20p NASA-CR-75741, IEEE PAPER-31-PP-66-434
Grant NSG/T/-70, Contract NSF GP-3086
Presented At Ieee Summer Power Meeting, New Orleans, 10-15 Jul. 1966

Descriptors: *Computer method, *Cylinder, *Digital computer, *Eddy current, *Hysteresis, *Steel, Analysis, Computer, Core, Current, Digital, Eddy, Ferromagnetism, Field, Loss, Magnetic, Material, Method, Numerical, Penetration, Program.

For abstract, see S 04 16.

N66-28584 Field 11F
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
OXIDATION PROTECTION OF NIOBIUM BY A NB SI2 LAYER, IMPREGNATED WITH SN AL.
by B. Lux, N. Perlhefter, and P. Stecher. May 66, 27p NASA-TT-F-10183
Transl. Into English Of The Paper "protection Contre L Oxydation Du Niobium Au Moyen D Une Couche De Nbsi2, Impregnee De Snal" Presented At The Cnes Intern. Conf., Paris, 7-12 Feb. 1966

Descriptors: *Aluminum compound, *Niobium compound, *Oxidation resistance, *Protective coating, *Silicide, *Tin compound, Aluminum, Cladding, Coating, Columbium, Compound, Film, Impregnation, Layer, Niobium, Oxidation, Oxide, Protection, Resistance, Silicon, Tin.

For abstract, see S 04 16.

N66-29081 Field 11F
CFSTI Prices HC$2.00 MF$0.50
General Dynamics/convair, San Diego, Calif.
S- N CHARACTERISTICS OF NOTCHED SPECIMENS FINAL REPORT.
by C. R. Smith. 15 Jun 66, 45p NASA-CR-54503
Contract NAS3-7268

Descriptors: *Aluminum alloy, *Fatigue test, *Mechanical property, *Notched metal, *Stress cycle, Alloy, Aluminum, Cycle, Fatigue, Loading, Mechanical, Metal, Notch, Number, Property, Stress, Tension, Test.

For abstract, see S 04 16.

N66-29213 Field 11F
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
STRESS-RUPTURE PROPERTIES OF TUNGSTEN WIRE FROM 1200 DEG TO 2500 DEG F.
by D. L. Mc danels, and R. A. Signorelli. Jul 66, 22p NASA-TN-D-3467

Descriptors: *Stress rupture, *Tungsten, *Wire, Ductility, High temperature, Matrix, Metal, Metallography, Microhardness, Recrystallization, Rupture, Stress.

For abstract, see S 04 16.

N66-29370 Field 11F
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
HARDNESS OF FIVE BORIDES AT 1625 DEG C.
by H. B. Probst, and W. A. Sanders. 1 Sep 65, 8p NASA-TM-X-56851
Submitted For Publication

Descriptors: *Boride, *Hafnium, *Hardness, *Holmium, *Lanthanum, *Niobium, *Transition element, *Zirconium, Density, Dwell, Element, Grain, High temperature, Load, Metal, Metallography, Microhardness, Size, Tester, Time, Transition.

For abstract, see S 04 16.

N66-29373 Field 11F
CFSTI Prices HC$1.00 MF$0.50
General Dynamics Corp., San Diego, Calif. John Jay Hopkins Lab. For Pure And Applied
VAPOR DEPOSITED TUNGSTEN FOR APPLICATION AS A THERMIONIC EMITTER MATERIAL.
by J. R. Lindgren, R. G. Mills, and A. F. Weinberg. 28 Jun 65, 15p NASA-CR-67182, GA-6473
Contract NAS3-6471
Presented At The Intern. Conf. On Thermionic Elec. Power Generation, London, 20-24 Sep. 1965

Descriptors: *Physical property, *Thermionic emission, *Tungsten, *Vapor deposition, Deposition, Ductility, Emission, Fluoride, Grain, Growth, Hardness, Hydrogen, Microstructure, Physical, Property, Purity, Reduction, Resistance, Substrate, Surface, Thermal, Thermionic, Treatment, Tubing, Use, Vapor.

For abstract, see S 04 16.

N66-29375 Field 11F
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYSIS OF THE SHEAR-BOND STRENGTH OF ALUMINA COATINGS.
by C. Baker, and S. J. Grisaffe. 19 Jul 65, 13p NASA-TM-X-56900
Submitted For Publication

Descriptors: *Aluminum oxide, *Ceramic bonding, *Plasma spraying, *Protective coating, *Stainless steel, Aluminum, Bonding, Ceramic, Coating, Data, Effect, Oxide, Particle, Plasma, Protection, Purity, Roughness, Size, Spraying, Stainless, Steel, Strength, Substrate, Surface, Weibull distribution.

For abstract, see S 04 16.

N66-29388 Field 11F
CFSTI Prices HC$1.00 MF$0.50
General Dynamics Corp., San Diego, Calif. John Jay Hopkins Lab. For Pure And Applied
SOME HIGH TEMPERATURE DIFFUSION STUDIES ON MATERIALS OF THERMIONIC INTEREST.
by F. D. Carpenter, R. G. Hudson, and L. Yang. 28 Jun 65, 15p NASA-CR-64768, GA-6472
Contract NAS3-6471
Presented At The Intern. Conf. On Thermionic Elec. Power Generation, London, 20-24 Sep. 1965

Descriptors: *Diffusion, *High temperature research, *Refractory metal, *Thermionic emission, *Uranium, Alloy, Carbide, Cladding, Emission, High temperature, Metal, Oxide, Refractory, Research, Thermionics, Tungsten, Zirconium.

For abstract, see S 04 16.

N66-29401 Field 11F
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
SALT STRESS CORROSION OF TI-8 AL-1 MO-1 V ALLOY SHEET AT ELEVATED TEMPERATURES.
by D. N. Braski, H. B. Dexter, G. J. Heimerl, and D. M. Royster. 1965, 28p NASA-TM-X-56881
Presented At The 5th Pacific Area Natl. Meeting Of The Am. Soc. For Testing And Mater., Seattle, 31 Oct. - 5 Nov. 1965 Its Paper No. 42

Descriptors: *Environmental testing, *Salt, *Stress corrosion, *Surface treatment, *Titanium alloy, Alloy, Aluminum, Calcium, Chloride, Cleaning, Corrosion, Crack, Environment, High temperature, Magnesium, Molybdenum, Peening, Shot, Sodium, Stress, Surface, Testing, Titanium, Treatment.

For abstract, see S 04 16.

N66-29447 Field 11F
CFSTI Prices HC$1.00 MF$0.50
Avco Corp., Tulsa, Okla.
A STUDY OF THE BLISTERING OF METAL SURFACES BY SOLAR SYSTEM IONS FIRST QUARTERLY PROGRESS REPORT, PERIOD ENDING 14 JUL. 1965.
by J. A. Cooley. Aug 65, 10p NASA-CR-67132, TR-65-363-11
Contract NASW-1203

Descriptors: *Aluminum oxide, *Irradiation, *Oxide film, *Single crystal, Aluminum, Blister, Crystal, Film, Gold, Ion, Oxide, Proton, Pure, Single, Solar, Surface, System, Vacuum.

For abstract, see S 04 16.

N66-29866 Field 11F
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF ORIENTATION OF FRICTION CHARACTERISTICS OF SINGLE-CRYSTAL BERYLLIUM IN VACUUM (10 MINUS10 TORR).
by D. H. Buckley. Jul 66, 20p NASA-TN-D-3485

Descriptors: *Beryllium, *Single crystal, *Sliding friction, Aluminum, Coefficient, Crystal, Crystallography, Friction, Orientation, Oxide, Polycrystal, Single, Sliding.

For abstract, see S 04 16.

N66-9871 Field 11F
CFSTI Prices HC$2.00 MF$0.50
Aerojet-general Corp., Sacramento, Calif.
DEVELOPMENT AND EVALUATION OF BRAZE ALLOYS FOR VACUUM FURNACE BRAZING.
by K. L. Gustafson. Jul 66, 35p NASA-CR-514
Contract NAS3-2555
Its Rept.-8800-26

Descriptors: *Brazing, *Copper alloy, *Rocket chamber, *Vacuum furnace, Alloy, Base, Chamber, Commercial, Copper, Furnace, Gold, High temperature, Impurity, Rocket, Rocket engine, Silicon, Thrust, Vacuum.

For abstract, see S 04 16.

N66-29907 Field 11F
CFSTI Prices HC$4.00 MF$1.00
Ipsen Industries, Inc., Rockford, Ill.
INVESTIGATION OF FOAMED METALS FOR LAUNCH AND SPACE VEHICLE APPLICATIONS.
by E. R. Byrnes Jr. and C. J. Twine. May 66, 131p NASA-CR-76061
Contract NAS8-11048

Descriptors: *Foamed material, *Launch vehicle, *Metallurgy, *Porous material, Aluminum, Foam, Material, Molybdenum, Nickel, Porosity, Sintering, Stainless, Steel, Titanium, Tool.

For abstract, see S 04 16.

N66-29978 Field 11F
CFSTI Prices HC$2.00 MF$0.50
Syracuse Univ. Research Inst., N. Y. Dept. Of Chemical Engineering And Metallurgy.
CREEP AT ELEVATED TEMPERATURES AND HIGH VACUUM SEMIANNUAL REPORT NO. 4.
by A. Giannuzzi, G. Gorsha, and K. Schroder. May 66, 26p NASA-CR-76088, SURI-MET-E-1189-566-SA
Grant NSG-619

Descriptors: *Bombardment, *Copper, *Creep, *High vacuum, *Oxidation, *Wire, Argon, Clean, Effect, High purity, Metallurgy, Pressure, Temperature.

For abstract, see S 04 16.

N66-35646 Field 11F
CFSTI Prices HC$1.00 MF$0.50
Atomics International, Canoga Park, Calif.
SOLUBILITY OF REFRACTORY METALS AND ALLOYS IN ALKALI METALS FIRST QUARTERLY REPORT, MAR. 3 - MAY 28, 1966.
by R. L. Eichelberger, and R. L. Mc kisson. 18 Jul 66, 25p NASA-CR-54993, A1-66-115
Contract NAS3-8507

Descriptors: *Alkali metal, *Corrosion resistance, *Liquid metal, *Refractory alloy, *Solubility, Alkali, Alloy, Coolant, Corrosion, Furnace, Getter, High temperature, Liquid, Metal, Oxygen, Potassium, Refractory, Resistance, System.

For abstract, see S 04 21.

N66-35776 Field 11F
CFSTI Prices HC$1.00 MF$0.50
Union Carbide Corp., Parma, Ohio. Carbon Products Div.
HIGH TEMPERATURE PROTECTIVE COATINGS FOR REFRACTORY METALS PROGRESS REPORT NO. 1, 21 APR. - 21 JUL. 1966.
by J. M. Criscione, and J. Rexer. 10 Aug 66, 14p NASA-CR-77634
Contract NASW-1405

Descriptors: *Diffusion effect, *Iridium, *Protective coating, *Refractory metal, Cell,

Coating, Deposition, Diffusion, Effect, Electrolyte, High temperature, Metal, Molybdenum, Niobium, Protection, Refractory, Tungsten.

For abstract, see S 04 21.

N66-35874 Field 11F
CFSTI Prices HC$2.00 MF$0.50
Westinghouse Electric Corp., Pittsburgh, Pa. Astronuclear Lab.
THE EFFECT OF HYDROGEN AND TEMPERATURE ON MECHANICAL PROPERTIES OF THE TI-5 AL-2.5 SN ELI ALLOY.
by R. A. Nadler. Sep 65, 35p NASA-CR-77890, WANL-TME-1287
Contract SNP-1

Descriptors: *Hydrogen, *Mechanical property, *Temperature effect, Absorption, Alloy, Aluminum, Band, Core, Decay, Effect, Mechanical, Property, Reactor, Temperature, Tin, Titanium.

For abstract, see S 04 21.

N66-35982 Field 11F
CFSTI Prices HC$1.00 MF$0.50
West Virginia Univ., Morgantown.
PRODUCTION OF DISPERSION ALLOYS WITH THE AID OF ULTRASONICS FINAL REPORT.
by H. V. Fairbanks. Jun 66, 15p NASA-CR-77778
Grant NSG-533

Descriptors: *Alloy, *Dispersion hardening, *Ultrasonics, Aluminum, Dispersion, Energy, Hardening, Inert, Material, Matrix, Molten, Treatment, Ultrasonic.

For abstract, see S 04 21.

N66-35984 Field 11F
CFSTI Prices HC$1.00 MF$0.50
Union Carbide Corp., Parma, Ohio. Carbon Products Div.
HIGH TEMPERATURE PROTECTIVE COATINGS FOR REFRACTORY METALS PROGRESS REPORT NO. 1, 21 APR. - 21 JUL. 1966.
by J. M. Criscione, and J. Rexer. 1966, 15p NASA-CR-77771
Contract NASW-1405

Descriptors: *High temperature research, *Protective coating, *Refractory metal, Application, Coating, Electrodeposition, High temperature, Iridium, Metal, Molybdenum, Niobium, Protection, Refractory, Research, Tungsten.

For abstract, see S 04 21.

N66-36122 Field 11F
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
MONOTONIC MAGNETOSTRICTION FOR NONFERROMAGNETIC MATERIALS.
by L. Flax. Sep 66, 15p NASA-TN-D-3605
Contract 129-02-05-09-22

Descriptors: *Magnetostriction, *Nonferrous metal, Bismuth, Coefficient, Crystal, Diamagnetism, Field, Magnetic, Metal, Moment, Monotony, Nonferrous, Property, Single.

For abstract, see S 04 21.

N66-36128 Field 11F
CFSTI Prices HC$3.00 MF$0.75
Hydronautics, Inc., Laurel, Md.
CAVITATION DAMAGE IN LIQUID METALS FINAL REPORT.
by H. S. Preiser, and A. Thiruvengadam. 29 Nov 65, 79p NASA-CR-72035, TR-467
Contract NAS3-4172

Descriptors: *Cavitation, *Liquid sodium, *Metal fatigue, *Stress corrosion, Corrosion, Damage, Fatigue, Frequency, High, High temperature, Liquid, Metal, Refractory, Resistance, Sodium, Stress, Test.

For abstract, see S 04 21.

N66-36138 Field 11F
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
INVESTIGATION OF CHROMIUM-IRON MOLYBDENUM AND CHROMIUM-IRON TUNGSTEN ALLOYS.
Issledovaniye Splavov Khrom-zhelezo-molibden I Khrom-zhelezo-vol' Fram
by R. A. Alfintseva, G. P. Dmitriyeva, V. G. Korobeynikova, V. M. Pan, and A. K. Shurin. Sep 66, 30p NASA-TT-F-10285
Transl. Into English From Sb. Nauchn. Rabot Inst. Metallofiz., Akad. Nauk Ukr. Ssr (Kiev), No. 20, 1964 P 108-124

Descriptors: *Chromium alloy, *Heat resistance, *Iron alloy, *Ternary system, Air, Alloy, Chromium, Diagram, Hardness, Heat, Iron, Molybdenum, Oxidation, Phase, Plasticity, Resistance, Stability, System, Ternary, Thermal, Tungsten.

For abstract, see S 04 21.

N66-36368 Field 11F
CFSTI Prices HC$2.00 MF$0.50
Temple Univ., Philadelphia, Pa.
CONTAINMENT OF LIQUID ZIRCONIUM AND NIOBIUM CARBIDES ON GRAPHITE BETWEEN 3500 DEG AND 4700 DEG K.
by J. A. Cahill, and A. V. Grosse. Sep 66, 42p NASA-CR-608
NASA ORDER C-54468A

Descriptors: *Containment, *Graphite, *Niobium carbide, *Zirconium carbide, Arc, Carbide, Crucible, Furnace, Helium, Liquid, Niobium, Pipe, Recession, Temperature, X-ray, Zirconium.

For abstract, see S 04 21.

PB-170 921 Field 11F, 18J, 20B
CFSTI Prices: HC$6.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
RELATIONS D'ORIENTATION ENTRE PHASES DANS LES TRANSFORMATIONS GAMMA TO ALPHA DES ALLIAGES URANIUM-MOLYBDENE (Orientational Relationships between Phases in the gamma to alpha Transformations for Uranium-Molybdenum Alloys).
Doctoral thesis in French,
by Gilbert Brun. Apr 66, 70p CEA-R-2973
Text in French; attached summary in English.

Descriptors: (*Uranium alloys, Phase studies), (*Molybdenum alloys, Phase studies), Grain structures (Metallurgy), Transformations, Crystallography, Electron diffraction analysis, Symmetry (Crystallography), Crystal lattices, Deformation, France.

A crystallographic study was made of the gamma to alpha + gamma transformation in the alloy containing 3 per cent by weight of molybdenum using electronic micro-diffraction; it was possible to establish the orientational relationships governing the germination of the alpha phase in the gamma phase.

PB-173 255 Field 11F
CFSTI Price: HC$1.00
National Bureau of Standards, Washington, D. C. Inst. for Applied Technology.
GOLD: ITS PROPERTIES, FABRICATION, AND USES.
Sep 66, 47p OTR-141

Descriptors: (*Gold plating, Thin films), (*Metal coatings, *Gold), Integrated circuits, Semiconductor devices, Coatings, Films, Vapor plating, Diffusion coating, Electrodeposition, Electroless plating, Reduction (Chemistry), Bonding, Brazing, Lubricants, Bibliographies, Protective treatments.

Recent Government-sponsored research on the subject of gold is covered largely in the research and electronics industry--integrated circuitry, semiconductors, solar cells, and transistors. In addition, much work on the basic physical and chemical properties of gold has been done, especially in areas of diffusion, plating, and thin films. Other reports relate to recent developments of gold applications in the fields of brazing, atomic energy, lubricants, and others. Considerable attention is paid to current and future areas of Government requirements and recommendations for future research.

AD-453 316 See Field 13I

AD-467 531 See Field 9A

AD-639 661 See Field 20F

AD-639 748 See Field 18H

AD-639 835 See Field 18J

AD-639 838 See Field 13H

AD-639 871 See Field 13H

AD-639 901 See Field 20B

AD-639 967 See Field 20L

AD-640 023 See Field 13H

AD-640 149 See Field 20E

AD-640 210 See Field 13H

AD-640 280 See Field 20B

AD-640 419 See Field 20K

AD-640 465 See Field 20K

AD-640 485 See Field 5A

AD-640 530 See Field 20L

ANL-7164 See Field 7D

BMI-1767 See Field 18J

BMI-1771 See Field 18J

BMI-1774 See Field 18J

BNL-959 See Field 7A

IDO-17190 See Field 18I

LA-3332 See Field 7D

N66-28041 See Field 20L

ORNL-3951 See Field 18J

PB-170 960 See Field 14B

RFP-741 See Field 18J

11G. MISCELLANEOUS MATERIALS

AD-639 646 Field 11G, 7B, 20L
CFSTI Prices: HC$3.00 MF$0.75
Eagle-Picher Industries, Inc., Miami, Okla. Miami Research Labs.
THE INVESTIGATION OF THE PREPARATION AND EVALUATION OF HIGH PURITY ELEMENTAL BORON.

Final rept., 1 Aug 63-31 Jul 66,
by J. T. Buford. 31 Aug 66, 78p
Contract AF 19 (628)-3259
Proj. AF-5620
Task 562005
AFCRL-66-581

Descriptors: (*Boron, Purification), (*Boron compounds, Synthesis (Chemistry)), Semiconductors, Materials, Iodides, Preparation, Distillation, Vapor plating, Zone melting, Pyrolysis, Gas chromatography, Impurities, Electrical properties, Crystallization, Phosphides, Arsenic alloys, Antimony alloys.

Identifiers: Boron arsenide, Boron antimonide, Boron iodide, Boron phosphides.

Ultrapure boron was produced via the boron triiodide intermediate. The BI3 was synthesized from crude elemental boron and C.P. grade iodine at various temperatures. A conversion efficiency of 56% was obtained using a charge of-4+6 mesh boron at a temperature of 900-950C. Purification of the boron triiodide was performed by distillation in a 30 plate Oldershaw distillation apparatus, by batch zoning of the BI3 matrix, and by vacuum distillation. Thermal decomposition of the distilled BI3 produced boron with approximately 50 ppm carbon as the major impurity. The carbon impurity was measured by a gas chromatographic technique. Boron was crystallized for electrical measurements by vacuum zoning, using induction heating and by melting in a high pressure resistance heated furnace. Using this same high pressure equipment the synthesis of boron phosphide, boron arsenide and boron antimonide was studied. (Author)

AD-640 068 **Field 11G**
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
THE RESIDUAL RESISTANCE RATIO OF PURE IRON.
Final rept.,
by A. I. Schindler, and B. C. La Roy. 23 Aug 66, 8p NRL-6395
ARPA Order-418
Proj. RR-007-01-46-5408

Descriptors: (*Iron, Resistance (Electrical)), (*Ferromagnetic materials, Impurities), Magnetic properties, Cryogenics, Inductance.

The resistance at zero magnetic induction of iron specimens of varying impurity content was determined by extrapolating the longitudinal magnetoresistance data taken at magnetic fields above saturation. Such resistance values may then be used to determine a modified residual resistance ratio (RRR), which is shown to be a more appropriate index of purity for ferromagnetic metals than that obtained with resistances measured in zero applied magnetic field. (Author)

AD-639 967 **See Field 20L**

AD-640 491 **See Field 18F**

PB-170 928 **See Field 14B**

11H. OILS, LUBRICANTS, AND HYDRAULIC FLUIDS

AD-478 916 **Field 11H**
CFSTI Prices: HC$2.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
THE INFLUENCE OF SUBSTRATE HARDNESS ON THE FORMATION AND ENDURANCE OF MOLYBDENUM DISULPHIDE FILMS.
Technical rept.,
by J. K. Lancaster. Dec 65, 29p TR-65265

Descriptors: (*Lubricants, *Molybdenum compounds), Sulfides, Tungsten compounds, Solids, Substrates, Hardness, Metal coatings, Gold, Lead, Silver, Surface properties, Thickness, Roughness, Indium, Brass, Friction, Carbides, Great Britain, Metals, Wear resistance, Performance (Engineering), Films, Adhesion, Test methods, Tool steel, Copper, Glass, Tin, Sapphires.

Identifiers: Molybdenum disulfide.

The hardness of the substrate metal affects the performance of MoS2 as a solid lubricant in two ways. Soft metal substrates facilitate adhesion and harder substrates facilitate cohesion. An effective compromise between these conflicting factors is achieved by pre-coating a hard substrate with a thin film of a softer metal (Pb, Au, Ag, etc.). Soft metal coatings are synergistic with MoS2 and enhance its performance as a solid lubricant. Measurements of the rates of wear of different metals lubricated by MoS2 show that the most important factor in the wear process is abrasion by the MoS2 itself. (Author)

AD-640 307 **Field 11H**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
OILS FOR GAS-TURBINE INSTALLATIONS,
by B. V. Losikov, and A. D. Fatyanov. 25 Apr 66, 16p FTD-TT-65-1843
TT-66-62442
Unedited rough draft trans. of Khimiya i Tekhnologiya Topliv i Masel (USSR) v9 n3 p58-62 1964.

Descriptors: (*Lubricants, Gas turbines), Oils, Lubricant additives, Wear resistance, Stability, Antioxidants, USSR.

CONCLUSIONS: There has been shown the possibility of considerable improvement in the stability of transformer oil at 170 and 200C with the additive of ionol (0.2--0.7%). It was established that the addition of 1% of sovol to transformer oil raises its antiwear properties to the level of the antiwear properties of the oil MK-22, while the presence of sovol in the oil does not lessen its antioxidation stability and does not lower its receptability to ionol. Tests of transformer oil which contains ionol and sovol on a fullsized gas-turbine installation confirmed completely the possibility of dependable working of the equipment with the indicated oil. Oil for gas turbines containing additives of ionol and sovol at the present time is being put out in accordance with GOST 10289-62. (Author)

AD-640 420 **Field 11H, 13I**
CFSTI Prices: HC$3.00 MF$0.75
Batelle Memorial Inst., Columbus, Ohio.
A STUDY OF THE INFLUENCE OF LUBRICANTS ON HIGH-SPEED ROLLING-CONTACT BEARING PERFORMANCE. PART VI. RESEARCH ON ELASTOHYDRODYNAMIC LUBRICATION ON HIGH-SPEED ROLLING-CONTACTS.
Final rept. May 65-May 66,
by Jerrold Kannel, J.Clarence Bell, J. A. Walowit, and C. M. Allen. Aug 66, 71p
Contract AF 33 (615)-2614
Proj. AF-3044
Task 304401
ASD-TDR-61-643-Pt-6
See also AD-467 173.

Descriptors: (*Lubricants, Antifriction bearings), (*Antifriction bearings, Lubrication), Roller bearings, Stresses, Films, Surface properties, Measurement, Temperature, Ethers, Mineral oils, Silicone plastics, Pressure.

Stress patterns in lubricated rolling-contact elements have been computed from surface pressures and temperatures between pairs of rolling disks, both cylindrical or both crowned, measured by means of evaporated surface transducers. The maximum mechanical shearing stresses computed for both cylindrical and crowned disks proved to be nearly equal to these that would have occurred under static contact, but the calculated depth of those stresses was reduced for cylindrical rollers in dynamic contact. The maximum shear reversals computed for rolling cylindrical disks were noticeably below the corresponding shear differences for the static cases. Local pressure anomalies such as the pressure spike in the one particular case chosen for investigation, did not seem to alter significantly the shear-stress patterns. Thermal shearing stresses do not appear to be a significant portion of the maximum stress, but do dominate over mechanical shearing stresses near the surface of the elements. Since the pressure distributions under lubricated contact seem to be dominated by the Hertz pattern, with only minor differences appearing with changes of lubricant, some reconsideration has been given to film thickness which is known to vary significantly with lubricant. Explanations have been sought for the unexpectedly thin films observed with polyphenyl ether at high rolling speeds. A new organization of non-Newtonian film thickness theory shows fair correlation with film measurements. An alternate theory considering thermal disturbances is being sought. (Author)

N66-27232 **Field 11H**
CFSTI Prices HC$5.00 MF$1.00
Westinghouse Electric Corp., Pittsburgh, Pa. Research Labs.
LUBRICANT STUDY IN ULTRAHIGH VACUUM AND IN VARIOUS GAS ENVIRONMENTS FINAL REPORT, 26 JAN. 1965 - 15 MAR. 1966.
by E. S. Bober, D. J. Boes, P. H. Bowen, and K. W. Grossett. 1966, 155p NASA-CR-65374
Contract NAS9-3815

Descriptors: *Bearing, *Friction, *Lubricant, *Ultrahigh vacuum, *Wear, Contact, Environment, Gas, Lubrication, Metal, Outgassing, Rolling, Sliding, Stainless, Steel, Surface, Ultrahigh, Vacuum.

For abstract, see S 04 15.

N66-27931 **Field 11H**
CFSTI Prices HC$4.00 MF$1.00
Skf Industries, Inc., King Of Prussia, Pa. Research Lab.
BEARING-LUBRICANT ENDURANCE CHARACTERISTICS AT HIGH SPEEDS AND HIGH TEMPERATURES FINAL REPORT, SEP. 1 - AUG. 31, 1965.
by L. B. Sibley, and C. J. Wachendorfer. 1965, 129p NASA-CR-75582, AL65T068
Contract NASW-492

Descriptors: *Ball bearing, *High temperature lubricant, *Lifetime, *Lubricant, Angular, Ball, Bearing, Contact, Endurance, Ester, Ether, Fluid, High speed, High temperature, Hydrocarbon, Machine, Organic, Oxidation, Polyphenyl, Test.

For abstract, see S 04 15.

N66-28033 **Field 11H**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Manned Spacecraft Center, Houston, Tex.
STATUS OF LUBRICANTS FOR MANNED SPACECRAFT.
by F. G. Delaat, J. H. Kimzey, and R. V. Shelton. Jun 66, 26p NASA-TM-X-58002
Presented At The 21st Ann. Meeting Of The Am. Soc. Of Lubrication Engr., Pittsburgh, 2 May 1966

Descriptors: *Apollo spacecraft, *Lubricant, *Manned spacecraft, Behavior, Coating, Compatibility, Dry, Film, Grease, Hazard, Health, Manned, Oxygen, Propellant, Requirement, Safety, Sliding, Solid, Spacecraft, Toxicity, Vacuum.

For abstract, see S 04 15.

AD-639 728 **See Field 13K**

AD-639 805 **See Field 20D**

11I. PLASTICS

AD-426 904 **Field 11I, 20K**
CFSTI Prices: HC$21.90
IIT Research Inst., Chicago, Ill.
AN INVESTIGATION OF MATERIAL PARAMETERS INFLUENCING CREEP AND FATIGUE LIFE IN FILAMENT WOUND LAMINATES.
Quarterly rept. no. 6, 26 Apr-26 Sep 63,
by R. H. Cornish, H. R. Nelson, L. J. Broutman, and B. W. Abbott. Dec 63, 123p Rept. no. 19
Contract NObs-86461
Proj. SF-013-05-03
Task 1025
See also AD-298 989, AD-427 009, and AD-602 495.

Descriptors: (*Filament construction wound, Mechanical properties), (*Laminates, Composite materials), Reinforcing materials, Glass textiles, Electron microscopy, Plastics, Sheets, Cylindrical bodies, Moisture, Density, Compressive properties, Elasticity, Fatigue (Mechanics), Stresses, Rupture, Shear stresses, Hydrostatic pressure, Creep, Microscopy, Ultrasonic radiation, Failure (Mechanics), Fracture (Mechanics), Experimental data, Test methods, Microphotography, Submarine hulls, Pressure vessels.

Identifiers: Biaxial stresses.

Progress is reported in 14 different areas which include: Phase I - flat laminate construction and specimen identification, flat laminate density, glass content and moisture pickup, uniaxial compression studies, compressive modulus of elasticity and Poisson's Ratio, uniaxial fatigue studies, stress rupture studies, horizontal shear strength; Phase II - end support conditions for hollow cylindrical test specimens subjected to an external hydrostatic pressure, specimen characterization, biaxial fatigue experiments, biaxial creep (stress-rupture experiments); and Phase III - specimen preparation, light microscope observations, and electron microscope observations. (Author)

AD-479 944 **Field 11I**
CFSTI Prices: HC$1.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
FRIEDEL-CRAFTS BONDING RESINS PREPARED FROM DIPHENOXYDIPHENYLSILANE.
Technical rept.,
by B. J. C. Moore. Nov 65, 17p TR-65259

Descriptors: (*Thermoplastics, *Friedel-Crafts reactions), (*Silicones, Thermoplastics), Synthesis (Chemistry), Phenols, Laminates, Aromatic compounds, Crystals, Thermal stability, Asbestos, Tensile properties, Elasticity, Reaction kinetics, Hydrolysis, Condensation, Silanes, Chlorine compounds, Crosslinking (Chemistry), Distillation, Density, Carbon compounds, Methanols, Xylenes, Aging (Materials).

Identifiers: Phenyl silanes.

The preparation of a Friedel-Crafts polymer from diphenoxydiphenylsilane and p-dichloroxylylene is described. Asbestos reinforced laminates bonded with the resin were examined for retention of mechanical properties after exposure to temperatures up to 300 C in air. The resistance to attack by acids and alkalis was also investigated. The thermal stability was found to be good in comparison with purely organic Friedel-Crafts resins, but the chemical resistance was poorer. A preliminary examination was made of a new type of Friedel-Crafts polymer (Mark 2) where the diphenoxydiphenylsilane was reacted with the dimethyl ether of p-xylylene glycol. (Author)

AD-639 683 **Field 11I**
CFSTI Prices: HC$2.00 MF$0.50
Naval Avionics Facility, Indianapolis, Ind.
PRESSED FILM TECHNIQUE AND INFRARED SPECTRA CATALOG FOR IDENTIFICATION OF THEMOPLASTICS.
Final technical rept.,
by James E. Coakley, and Hugh H. Berry. 1 Sep 66, 32p NAFI-TR-911

Descriptors: (*Thermoplastics, Spectra (Infrared)), (*Infrared spectroscopy, Thermoplastics), (*Films, *Molding), Test methods, Continuous spectrum, Catalogs, Acetal plastics, Acrylic resins, Polyethylene plastics, Halocarbon plastics, Polyamide plastics, Polyester plastics, Isocyanate plastics, Styrene plastics, Cellulosic plastics, Vinyl plastics.

A modified compression molding technique for obtaining film of thermoplastics for infrared examination is described. Small specimens of thermoplastic materials were heated to their softening points and pressed into thin, transparent film from which were obtained infrared spectra. The advantages and limitations of this technique are discussed. A pressed film spectra catalog was compiled to be used as a reference for identifying unknown samples. This catalog includes spectra of most of the commercially important thermoplastics, including the newer ones. (Author)

AD-640 054 **Field 11I, 11D, 13J**
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
MICROPARTICLE AND FIBER REINFORCEMENT OF EPOXY RESINS.
Interim rept.,
by A. G. Sands, R. C. Clark, and E. J. Kohn. 26 Aug 66, 15p NRL-6403
Proj. SR-007-03-04-1008

Descriptors: (*Epoxy plastics, Reinforcing materials), (*Filament wound construction, *Composite materials), (*Submarine hulls, Filament wound construction), Binders, Glass textiles, Fibers, Deep submergence, Aluminum compounds, Oxides, Silicon compounds, Carbon black, Compressive properties, Tensile properties, Aging (Materials), Particles.

Microparticle and fiber materials have been investigated as reinforcing agents for a diglycidyl ether of bisphenol A type of epoxy resin. These materials were limited to low concentrations in order to insure retention of the resin binder properties, such as viscosity and pot life, required for glass-filament-winding processes. In general the material screened did not substantially improve the compression properties of the cast resin as compared to the best unfilled controls. The greatest improvement was achieved with colloidal boehmite alumina and Hi-Sil X303 silica, when the stoichiometric amount of amine curing agent was used. The alumina was superior to the silica in increasing the resin modulus of toughness, but the silica gave higher values for the compression yield and ultimate strengths. The highest values for the compression properties of the unfilled resin controls were obtained when 78% of the stoichiometric amount of m-phenylene diamine (CL) curing agent and a critical 'B' stage curing temperature were used. As indicated by a limited study, 'flaw sensitivity' or surface imperfections may significantly influence the compression strength of unfilled cast resin test specimens, whereas these effects were negligible with specimens containing Hi-Sil X303 silica. Experiments to determine the effect on the interlaminar shear strength of glass-filament NOL rings wound with resins containing colloidal boehmite alumina and Hi-Sil X303 silica were inconclusive because of the high void content of state-of-the-art wound NOL rings. (Author)

AD-640 273 **Field 11I, 13D**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
CONDUCTIVE TRANSPARENT THERMOPLASTIC FILMS.
Progress rept. no. 2, 1 Jul 65-30 Jun 66,
by I. H. Custis, 30 Jun 66, 13p
Proj. NABC-AML (38)R-360
See also AD-473 193.

Descriptors: (*Thermoplastics, Electrostatics), (*Protective coverings, Thermoplastics), Test equipment, Polyethylene plastics, Additives, Chromium compounds, Phosphines, Coatings.

Identifiers: Antistatic agents.

Progress in developing conductive transparent thermoplastic materials by using internal antistatic agents, is reported. A test procedure for evaluating the electrostatic properties was developed and is described. (Author)

AD-640 286 **Field 11I, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THERMAL DEGRADATION OF POLYETHYLENE,
by N. A. Slovokhotova, M. A. Magrupov, and V. A. Kargin. 6 Apr 66, 16p FTD-TT-65-1691
TT-65-13418
Unedited rough draft trans. of Vysokomolekulyarnye Soedineniya (USSR) v6 n11 p1974-9 1964.

Descriptors: (*Polyethylene plastics, Pyrolysis), Thermal stability, Vapors, Spectra (Infrared), Chemical reactions, Chemical bonds, Free radicals, Impurities, USSR.

The thermal degradation of high and low pressure polyethylene (HPPE and LPPE) at temperatures from 325 to 415C was investigated under vacuum in a closed system and under conditions of removal of the volatiles from the reaction space. An IR spectrum analysis of the degradation products demonstrated that when the reaction is carried out in the closed system at 360C and higher, secondary reactions between the pyrolysis products leading to increase in trans-vinylene and decrease of vinyl unsaturation become of importance. The increase in the relative number of trans-vinylene double bonds in the PE pyrolysis products is not in accord with the scheme of formation of such bonds in degradation of the polymeric chain at the free radical center close to the branching node of the chain. It is suggested that trans-vinylene double bonds are formed as the result of migration of the end double bonds to the middle of the chain, and also of intramolecular encounter of two free radical centers. It was found that inorganic impurities in PE effect the distribution of the unsaturation in its thermal degradation products. The reason for the higher thermal resistance of LPPE than HPPE is discussed. (Author)

AD-640 377 **Field 11I**
CFSTI Prices: HC$4.00 MF$0.75
Plastics Technical Evaluation Center, Picatinny Arsenal, Dover, N. J.
GOVERNMENT SPECIFICATIONS AND STANDARDS FOR PLASTICS, COVERING DEFENSE ENGINEERING MATERIALS AND APPLICATIONS (REVISED),
by Norman E. Beach. Jul 66, 104p PLASTEC Note-6A

Descriptors: (*Plastics, Specifications), Standards, Military requirements, Polymers, Elastomers, Adhesives, Reinforcing materials, Laminated plastics, Sandwich construction.

This report lists the specifications and standards for those plastic materials and plastics applications which are considered to be of interest to engineers concerned with the design, development, production, and handling of defense hardware. Included are specifications for the basic or raw materials, composite materials, and the items and applications of potential defense concern. Excluded are specifications on life-situation items: clothing, utensils and furniture, and decorating or preservative coatings. The body of the material is presented in four parts: specifications for or involving specific plastic materials, title-stated or otherwise identified; general reference documents; specifications for or involving unspecified plastics; a subject index; a numerical index. Complete citations for 1210 specifications are given, covering: number,

date, title, the existence of a Qalified Products List, the status of coordination among the services (whether limited to one, or not limited), the agency which prepared the specification, and the custodian (s) of the specification. Included is a discussion of government specifications, and instructions on their procurement. (Author)

AD-640 429 **Field 11I**
CFSTI Prices: HC$1.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
THE EFFECT OF WATER ON THE GELATION OF AN UNSATURATED POLYESTER RESIN.
Technical rept.,
by N. C. W. Judd. Jun 66, 12p TR-66191

Descriptors: (*Composite materials, Aging (Materials)), (*Polyester plastics, *Gels), Glass textiles, Binders, Polymerization, Impurities, Water, Great Britain.

Water retards the gelation and polymerisation of an unsaturated polyester resin but to a lesser extent than benzoquinone. On the basis of the data obtained and other information reported in the literature it appears advisable to keep the uptake of water from the environment during a fabrication process to a minimum. (Author)

N66-28372 **Field 11I**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
THE USE OF FOAMED POLYURETHANS FOR MANUFACTURING SOLAR ENERGY COLLECTORS.
Primeneniye Penopoliuretanov Dlya Izgotovleniya Kontsentratorov Solnechnoy Energii
by D. Alavutdinov, I. A. Novikova, and S. N. Vilkova. Jun 66, 13p NASA-TT-F-10189
Transl. Into English From Geliotekhn. (Ussr), No. 4, 1965 P 27-30

Descriptors: *Foamed material, *Polyurethane foam, *Solar energy, Energy, Film, Foam, Lightweight, Manufacturing, Material, Plastic, Polyurethane, Solar.

For abstract, see S 04 15.

N66-29396 **Field 11I**
CFSTI Prices HC$1.00 MF$0.50
Rensselaer Polytechnic Inst., Troy, N. Y. Dept. Of Chemistry.
THERMODYNAMICS OF CRYSTALLINE LINEAR HIGH POLYMERS. V - EXTENDED-CHAIN COPOLYMERS OF POLYETHYLENE.
by T. Arakawa, and B. Wunderlich. 1964, 7p
NASA-CR-60460
Grant NSG-100
Submitted For Publication

Descriptors: *Copolymer, *Melting point, Analysis, Butene, Calorimetry, Crystallization, Density, Differential, Dilatometry, Ethylene, Hydrostatic, Melting, Point, Pressure, Propylene, Range, Thermal, Volume.

For abstract, see S 04 16.

N66-29399 **Field 11I**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
LARGE PERIODS IN POLYETHYLENETEREPHTHALATE FILMS.
Bol'shiye Periody V Plenke Polietilentereftalata
by A. I. Kitaygorodskiy, YU. M.Petrov, and D. YA.Tsvankin. Oct 63, 13p NASA-TT-F-8551
Transl. Into English From Vysokomolekul. Soedin. (Ussr), V. 5, No. 7, 1963 P 1062-1068

Descriptors: *Plastic film, *Polyethylene terephthalate, *X-ray scattering, Axis, Crystallite, Distribution, Film, Intensity, Macromolecule, Orientation, Period, Plastic, Polyethylene, Scattering, Terephthalate, Texture, X-ray.

For abstract, see S 04 16.

N66-29400 **Field 11I**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
TRANSIENT CURRENTS IN PLASTIC INSULATORS AND THE EFFECTS OF GAMMA-RAY IRRADIATION.
by S. Ide, H. Saito, and T. Urai. May 64, 9p
NASA-TT-F-8862
Transl. Into English From Kobunshi Kagaku (Tokyo), V. 20, No. 222, 1963 P 583-586

Descriptors: *Electric current, *Electric insulation, *Gamma radiation, *Plastic, *Radiation effect, Conductivity, Current, Decay, Effect, Electric, Film, Gamma, Methacrylate, Polycarbonate, Polyethylene, Polymer, Polypropylene, Polystyrene, Radiation, Thin, Transient.

For abstract, see S 04 16.

N66-29737 **Field 11I**
CFSTI Prices HC$3.00 MF$0.75
Case Inst. Of Tech., Cleveland, Ohio. Polymer Science Group.
INFRARED STUDIES OF CHAIN FOLDING IN POLYETHYLENE TEREPHTHALATE, PART I STATUS REPORT, OCT. 31, 1965 - APR. 30, 1966.
by M. J. Hannon, and J. L. Kdenig. 1966, 72p
NASA-CR-76011
Contract NGR-36-003-054

Descriptors: *Infrared spectrum, *Polyethylene terephthalate, *Polymer, *Spectral analysis, Analysis, Annealing, Chain, Crystallization, Deformation, Folding, Infrared, Polyethylene, Spectral, Spectrum, Terephthalate.

For abstract, see S 04 16.

N66-29753 **Field 11I**
CFSTI Prices HC$3.00 MF$0.50
Rai Research Corp., Long Island City, N. Y.
DEVELOPMENT OF A PROTOTYPE PLASTIC SPACE ERECTABLE SATELLITE QUARTERLY REPORT, MAR. - MAY 1966.
by V. Dagostino, P. Keusch, and J. Raffo. 27 Jun 66, 67p NASA-CR-76045, RAI-368
Contract NAS5-3923

Descriptors: *Mechanical property, *Polyethylene, *Space erectable structure, *Tensile strength, Density, Erectable, Film, High density, Mechanical, Plastic, Pressure, Property, Solar, Space, Standard, Strength, Structure, Tensile, Thickness.

For abstract, see S 04 16.

AD-477 806 **See Field 7C**

AD-482 530 **See Field 7C**

AD-483 067 **See Field 7C**

AD-639 758 **See Field 6R**

AD-640 250 **See Field 7C**

AD-640 465 **See Field 20K**

PB-173 279 **See Field 13B**

Y-1547 **See Field 13I**

11J. RUBBERS

AD-453 258 **Field 11J**
CFSTI Price: HC$1.60
Royal Aircraft Establishment, Farnborough (England).
NETWORK SCISSION REACTIONS IN PEROXIDE CURED METHYL-VINYL SILICONE RUBBER,
by D. K. Thomas. Aug 64, 14p Technical note TN-CPM-82

Descriptors: (*Synthetic rubber, Chemical bonds), (*Silicone plastics, Chemical bonds), (*Vulcanizates, Chemical bonds), Chemical reactions, Vulcanization, Polymers, Stresses, Peroxides, Aging (Materials), Siloxanes, Relaxation time, Great Britain.

Stress-relaxation studies show that network scission in peroxide cured methyl-vinyl silicone rubbers at temperatures up to 250C is largely the result of hydrolytic reactions in the main chain polymer. There are indications that at 250 C and above oxidative scission of the cross-links is becoming a significant process. There is no indication that acidic by-products of the vulcanization reaction catalyse the hydrolysis of siloxane bonds in the polymer. (Author)

AD-470 542 **Field 11J**
CFSTI Prices: HC$1.00 MF$0.50
Naval Applied Science Lab., Brooklyn, N. Y.
STANDARDIZATION PROGRAM ON SHELF AGING OF NATURAL AND SYNTHETIC RUBBER MATERIALS.
Supplementary rept.,
by Saul A. Eller. 28 Sep 65, 15p
Projs. 5974, R007-03-04

Descriptors: (*Rubber, Aging (Materials)), (*Aging (Materials), Synthetic rubber), Standardization, Test methods, Storage, Degradation, Butyl rubber, Styrene plastics, Tensile properties, Heat.

Identifiers: Neoprene, swelling (Materials).

Test specimens made from butadiene-styrene, buna N, natural rubber and neoprene were subjected to shelf aging and low temperature conditioning for periods up to 7 years while in packaged and unpackaged states. Following the aging period, the tensile strength, elongation, tensile product, modulus at 300% elongation, swelling ratio, compression set and stress relaxation of the specimens were determined. Tensile product, modulus at 300% elongation and swelling ratio were found to be the parameters which best indicated the trend in the deterioration of the elastomers. The results of shelf aging in a packaged condition were compared with the results obtained in accelerated heat aging tests, reported previously, and it was found that accelerated heat aging for 10 weeks at 140 F would cause a greater deterioration in the physical properties of butadiene-styrene and buna N specimens than shelf aging for a period of 5 years and a greater deterioration in the physical properties of natural rubber and neoprene specimens than shelf-aging for a period of 6 years. There was comparatively little additional deterioration in the physical properties of butadiene-styrene and buna N specimens despite an increase in the period of shelf aging from 1 1/2 years to 3 1/2 years and even to 5 years, and for the natural rubber and neoprene specimens despite an increase in the period of shelf aging from 2 1/2 years to 4 years and even to 6 years. Recommendations were made to increase the shelf life of end-items made from butadiene-styrene and buna N to 5 years, to reduce the shelf life to end-items made from natural rubber to 1 2 year and to increase the shelf life of end-items from neoprene to 6 years. (Author)

AD-639 770 **Field 11J**
Not available from CFSTI.
Graduate Aeronautical Labs., Calif. Inst. of Tech., Pasadena.
THE MECHANICAL AND OPTICAL CHARACTERIZATION OF A SOLITHANE 113 COMPOSITION,
by R. J. Arenz, C. W. Ferguson, and M. L. Williams. 1966, 6p GALCIT Pub-623

Availability: Published in Proceedings of the SESA International Congress on Experimental Mechanics (2nd) 1965.

Descriptors: (*Isocyanate plastics, *Viscoelasticity), Mechanical properties, Optical properties, Phase studies, Photoelasticity, Refraction, Creep.

A complete mechanical and optical characterization is obtained from constant-strain-rate tests for a typical Solithane 113 composition, a urethane-rubber compound having high birefringent sensitivity and excellent optical-transmission properties. Its viscoelastic transition region is found to span about six decades of logarithmic time, somewhat narrower than for other materials of the urethane family. (Author)

N66-27317 **Field 11J**
CFSTI Prices HC$3.00 MF$0.50
Boeing Co., Seattle, Wash. Aerospace Group.
LINERS FOR NON-METALLIC TANKS FINAL REPORT.
by J. T. Hoggatt, and L. J. Workman. Jan 66, 54p
NASA-CR-54868
Contract NAS3-7944

Descriptors: *Filament winding, *Liner, *Liquid hydrogen, *Tank, Biaxis, Diaphragm, Elongation, Filament, Hydrogen, Liquid, Low temperature, Tensile, Uniaxial, Winding.

For abstract, see S 04 15.

AD-463 205 **See Field 7C**

AD-640 252 **See Field 14B**

11K. SOLVENTS, CLEANERS, AND ABRASIVES

AD-639 963 **See Field 13H**

11L. WOOD AND PAPER PRODUCTS

AD-639 922 **Field 11L, 11C**
CFSTI Prices: HC$2.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
CREOSOTED WOOD IN A MARINE ENVIRONMENT - A SUMMARY REPORT.
Technical rept. for Aug 52-Jun 66,
by Harry Hochman. Sep 66, 33p TR-R-476
Proj. Y-R005-07-01-007

Descriptors: (*Wood, Protective treatments), (*Protective treatments, Creosote), Impregnation, Effectiveness, Life expectancy, Marine borers, Temperature, Degradation, Sea water.

A number of notions concerning the behavior of creosote in marine environments are examined. Among these are mechanical loss, leaching, threshold concentration, and bioenvironment. Factors involved in predicting service life are presented and the conclusion is drawn that creosote protects wood for long periods of time in cold-water harbors but not in warm-water harbors having a high population of Limnoria tripunctata. (Author)

PB-173 140 **Field 11L**
CFSTI Prices: HC$1.00 MF$0.50
Forest Products Lab., Madison, Wis.
A PROBE FOR ACCURATE DETERMINATION OF MOISTURE CONTENT OF WOOD PRODUCTS IN USE.
Research note,
by John E. Duff. Aug 66, 17p FPL-0142

Descriptors: (*Wood, Moisture), (*Probes, Wood), Test equipment, Construction, Operation, Humidity, Measurement, Dehydration, Resistance (Electrical).

The fabrication and use of a simple, inexpensive, reliable probe for determining moisture content of a wood product in use is described. The probe, made primarily from a strip of wood, can be used at moderate temperature, at high and low moisture conditions, and for determining average atmospheric moisture conditions. Furthermore, the probe is likely to have use for wood-moisture measurements in kiln drying, high-temperature drying, fire testing, paint studies, and investigations of low-temperature environments where moisture amounts and changes are of major significance. (Author)

PB-173 141 **Field 11L, 2F**
CFSTI Prices: HC$1.00 MF$0.50
Forest Products Lab., Madison, Wis.
PHYSICAL AND MECHANICAL PROPERTIES OF BLACKBUTT EUCALYPTUS GROWN IN HAWAII.
Research paper,
by C. C. Gerhards. Aug 66, 12p FPL-65
Supported by Hawaii Dept. of Land and Natural Resources. Forestry Div.

Descriptors: (*Trees, *Hawaii), (*Wood, Physical properties), Mechanical properties, Bending, Compressive properties, Hardness, Shrinkage, Density, Toughness, Shear stresses, Forestry.

Identifiers: Eucalyptus pilularis.

Physical and mechanical properties of blackbutt eucalyptus (Eucalyptus pilularis Sm.) grown in Hawaii were determined because of the interest in the species for forestation in Hawaii. Based on the property evaluations in this study, the wood is heavy, very strong in bending and compression, hard and exceedingly stiff, and its shrinkage is very large. It is not as dense nor as strong and hard as the wood native to Australia, but it essentially has the same stiffness and shearing strength. The results of this research will aid in forestation planning in Hawaii and contribute to efficient utilization of the species. (Author)

PB-173 199 **Field 11L**
CFSTI Prices: HC$3.00 MF$0.75
Forest Products Lab., Madison, Wis.
PROPERTIES OF SOUTHERN PINE IN RELATION TO STRENGTH GRADING OF DIMENSION LUMBER.
Research paper,
by D. V. Doyle, and L. J. Markwardt. Jul 66, 66p FPL-64

Descriptors: (*Wood, Mechanical properties), Structural properties, Stresses, Bending.

The report presents results of extensive research to determine the strength and related properties of southern pine in relation to the structural grading of dimension lumber. The study affords an appraisal of the strength characteristics of structural grades of southern pine in different sizes in relation to allowable working stresses; provides a means of evaluating the efficiency of visual grading in bending and compression; and includes pertinent data relating to an appraisal of the possibilities and limitations of machine grading on a stiffness evaluation. (Author)

PB-173 340 **Field 11L, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Forest Products Lab., Madison, Wis.
NEWS AND VIEWS OF THIS KILN DRYING BUSINESS: PRESURFACING GREEN OAK LUMBER TO REDUCE SURFACE CHECKING.
Research note,
by Raymond C. Rietz, and Joseph A. Jenson. Sep 66, 2p FPL-0146

Descriptors: (*Wood, Degradation), Surfaces, Finishes + finishing, Shrinkage, Drying, Processing.

The experiment can be interpreted to mean that presurfacing green northern red oak will: (1) minimize surface checking during initial drying when the drying potential is fairly severe; (2) reduce honeycomb due to the penetration and extension of surface checks; and (3) produce a more uniformly dried product in a shorter drying period. Thus, presurfacing of surface-check-prone. woods should be given consideration when checkfree lumber is needed for product processing. (Author)

PB-173 341 **Field 11L**
CFSTI Prices: HC$1.00 MF$0.50
Forest Products Lab., Madison, Wis.
RELATION OF VISUAL ESTIMATES OF DECAY TO SPECIFIC GRAVITY LOSS IN STORED COTTONWOOD AND WILLLOW.
Research note,
by Wallace E. Eslyn. Sep 66, 10p FPL-0143

Descriptors: (*Wood, Degradation), Storage, Density, Correlation techniques.

Visual estimates of decay and actual losses in specific gravity in cottonwood and willow bolts were plotted and compared according to species of host and type of decay. Although correlations between estimates of decay and actual losses in specific gravity were significant at the 99 percent level, the confidence limits obtained were, in each case, considerably wide. The diversity of fungi in the bolts were considered responsible for the inability to obtain narrower confidence limits. In future studies where diverse fungi are involved, it is suggested that field estimates be based on both area of infection and stage of decay. (Author)

PB-173 342 **Field 11L**
CFSTI Prices: HC$1.00 MF$0.50
Forest Products Lab., Madison, Wis.
DIMENSIONAL CHANGES IN KILN-DRIED SOFTWOOD LUMBER AFTER SURFACING AND DURING STORAGE.
Research note,
by G. L. Comstock. Sep 66, 24p FPL-0144

Descriptors: (*Wood, Shrinkage), Storage.

Dimensional changes after kiln drying caused by surfacing and storage at constant moisture content were measured on 2- by 6-inch specimens of Douglas fir and loblolly pine. Two test procedures were used for observing the dimensional changes. In procedure I, the effect on width only of surfacing immediately after drying and storing was determined. In procedure II, the effects on both width and thickness of storage before surfacing were included as well as the effects after surfacing. Small dimensional changes were observed, but these are of little or no practical significance, since they are much smaller than the dimensional changes due to normal moisture fluctuations. (Author)

AD-640 428 **See Field 18C**

PB-173 142 **See Field 13I**

12A. MATHEMATICS AND STATISTICS

AD-467 864 **Field 12A, 8C**
CFSTI Prices: HC$2.00 MF$0.50
New York Univ., N. Y. Dept. of Meteorology and Oceanography.
OPERATING PROCEDURES FOR COMPUTING ZERO AND ORDINATE CROSSINGS OF STATIONARY GAUSSIAN NOISE USING AN IBM 650 CALCULATOR,
by Raymond G. Stevens. Aug 59, 27p Technical rept. TR-2
Contract Nobs-72018
See also PB-140 755.

Descriptors: (*Statistical processes, Programming (Computers)), (*Programming (Computers), Data processing systems), Noise, Communication theory, Punched cards, Ocean waves.

Identifiers: IBM 650, Zero-crossing intervals, Statisan 1, Gaussian noise.

The report describes the operating of a group of computer programs for calculating estimates of the zero crossing distribution of a random stationary process. These programs were developed and used for the calculation of zero crossing distributions of ocean wave records. (Author)

AD-639 665 **Field 12A, 20K**
CFSTI Prices: HC$1.00 MF$0.50
North Carolina State Univ., Raleigh.
MATHEMATICAL ANALYSIS OF RESONANT OSCILLATIONS.
Final rept. 15 Jul 65-31 Aug 66,
by Raimond A. Struble. 30 Sep 65, 4p
Grant DA-ARO (D)-31-124-G630
AROD-4105:22

Descriptors: (*Oscillation, Mathematical analysis), (*Hamiltonian, Motion), Resonance, Equations of motion.

Research concerned with the questions of periodic motion in conservative Hamiltonian systems is summarized. (Author)

AD-639 718 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Purdue Univ., Lafayette, Ind. Dept. of Statistics.
ON THE PROBLEM OF RANKING AND SELECTION FROM K FIXED POPULATIONS,
by W. J. Studden. Aug 66, 27p Mimeograph Series-89
Contracts Nonr-1100 (26), AF 33 (657)-11737

Descriptors: (*Decision theory, Population (Mathematics)), Optimization, Statistical analysis.

AD-639 719 **Field 12A, 14D**
CFSTI Prices: HC$1.00 MF$0.50
Purdue Univ., Lafayette, Ind. Dept. of Statistics.
SOME ASPECTS OF SELECTION AND RANKING PROCEDURES WITH APPLICATIONS,
by Shanti S. Gupta, and William J. Studden. Jul 66, 17p Mimeograph Series-81
Contracts Nonr-1100 (26), AF 33 (657)-11737

Descriptors: (*Decision theory, Population (Mathematics)), (*Reliability, Statistical analysis), Probability.

The purpose of the paper is to discuss the problems of ranking and selection in a more or less unified form and suggest some applications to problems in reliability. More specifically, the authors discuss the problem of selecting a sub-set of k populations or processes which in some sense is a best subset.

AD-639 731 **Field 12A**
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
REDUCTION OF TWO-POINT BOUNDARY VALUE PROBLEMS IN A VECTOR SPACE TO INITIAL VALUE PROBLEMS BY PROJECTION,
by Karl G. Guderley, and Paul J. Nikolai. 4 Oct 65, 23p ARL-66-0169
Proj. AF-7071
Availability: Published in Numerische Mathematik v8 p270-89 1966.

Descriptors: (*Boundary value problems, Numerical methods and procedures), Matrix algebra.

AD-639 740 **Field 12A**
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
THE CHEBYSHEV POLYNOMIAL OF BEST APPROXIMATION TO A GIVEN FUNCTION ON AN INTERVAL,
by O. Shisha. 7 Sep 65, 9p ARL-66-0174
Proj. AF-7071
Availability: Published in Mathematics of Computation v20 n94 p266-71 Apr 1966.

Descriptors: (*Polynomials, *Approximation (Mathematics)), (*Minimax technique, *Functions), Functional analysis.

AD-639 746 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
ON THE ASYMPTOTIC NORMALITY OF ONE SAMPLE CHERNOFF-SAVAGE TEST STATISTICS.
Technical rept.,
by Madan Lal Puri, and Pranab Kumar Sen. Jun 66, 10p IMM-350
Contract Nonr-285 (38), Grant PHS-GM-12868
Proj. NR-042-206

Descriptors: (*Statistical tests, Theorems), Sampling, Distribution functions, Decision theory.

Asympototic normality of a class of one sample Chernoff-Savage type of rank order statistics has been established by Govindarajulu ((1960), Central limit theorems and asymptotic efficiency for one sample nonparametric procedures). His proof appears to be quite lengthy and cumbersome. The object of this note is to provide a greatly shortened and simplified proof of the same theorem. (Author)

AD-639 772 **Field 12A**
Not available from CFSTI.
Deutsche Versuchsanstalt fuer Luft- und Raumfahrt, e.V., Freiburg im Breisgau (West Germany).
ERROR ESTIMATES FOR LUKE'S APPROXIMATION FORMULAS FOR BESSEL AND HANKEL FUNCTIONS,
by Hans Krumhaar. 1965, 12p
Availability: Published in Zeitschrift fur Angewandte Mathematik und Mechanik v45 n4 p245-55 1965.

Descriptors: (*Special functions (Mathematical), *Approximation (Mathematics)), Errors, Integrals, Inequalities, Functional analysis, West Germany.

Identifiers: Luke's approximation.

Error estimates are presented for approximation formulas for Bessel functions and for Hankel functions. These approximation formulas are obtained by means of the trapezoidal rule according to Luke. The error estimates are valid in the case of Bessel functions for arbitrary real or complex argument z, they hold in the case of the Hankel functions for arguments z with a positive imaginary part. Use is made of Luke's results, some of them are repeated in order to make this paper self-contained. In order to derive the error estimates for the Hankel functions some inequalities are engaged for the Gamma function with certain complex arguments and for Bessel functions of certain complex orders. (Author)

AD-639 828 **Field 12A**
Not available from CFSTI.
Pisa Univ. (Italy).
SOLUZIONI PERIODICHE DELL'EQUAZIONE DELLE ONDE CON TERMINE DISSIPATIVO NON LINEARE (Periodic Solutions of the Wave Equation with Non Linear Dissipative Term),
by Giovanni Prodi. 26 May 65, 16p
Grant AF-EOAR-42-65
Proj. AF-9749
Task 974902
AFOSR-66-1204
Text in Italian, summary in English.
Availability: Published in Rendiconti del Seminario Matenatico della Universita di Padova p1-13 1965.

Descriptors: (*Partial differential equations, Theorems), Equations of motion, Functional analysis, Boundary value problems, Wave functions, Italy.

Identifiers: Wave equation.

An existence and uniqueness theorem is proved for the n-dimensional wave equation with non linear dissipative term: u' - delta u ; beta (u') = f (f periodic). The function beta is supposed to be monotone, with a rate of growth of p-power type. (Author)

AD-639 832 **Field 12A**
Not available from CFSTI.
Hebrew Univ., Jerusalem (Israel).
LIMIT THEOREMS FOR MARKOV PROCESSES,
by S. R. Foguel. 18 Jan 65, 14p
Grant AF-EOAR-27-65
Proj. AF-9749
Task 974902
AFOSR-66-1220
Availability: Published in Transactions of the American Mathematical Society v121 n1 p200-9 Jan 1966.

Descriptors: (*Theorems, *Statistical processes), (*Measure theory, Statistical processes), Israel.

Identifiers: Limit theorem.

AD-639 849 **Field 12A**
Not available from CFSTI.
Northwestern Univ., Evanston, Ill.
A NOTE ON AN ITERATIVE METHOD FOR GENERALIZED INVERSION OF MATRICES.
Revised ed.,
by Adi Ben-Israel. 26 Aug 65, 3p
Contracts Nonr-1228 (10), DA-31-124-ARO (D)-322
Proj. NR-047-021
Prepared in cooperation with Technion - Israel Inst. of Tech., Haifa.
Availability: Published in Mathematics of Computation v20 n95 p439-40 Jul 1966.

Descriptors: (*Iterative methods, *Matrix algebra), Sequences, Theorems.

Identifiers: Generalized matrix inverse.

AD-639 853 **Field 12A**
Not available from CFSTI.
Technische Hochschule, Munich (West Germany). Mathematisches Institut.
ASYMPTOTIC UPPER AND LOWER BOUNDS FOR RESULTS OF EXTRAPOLATION METHODS,
by Roland Bulirsch, and Josef Stoer. 12 Jul 65, 13p
Grant AF-EOAR-48-65
Proj. AF-9749
Task 974901
AFOSR-66-1242
Availability: Published in Numerische Mathematik v8 p93-104 1966.

Descriptors: (*Numerical methods and procedures, Errors), (*Differential equations, *Asymptotic series), Integration, Matrix algebra, West Germany.

The method of Runge and Konig for obtaining asymptotic bounds for the discretisation error for the Runge-Kutta Method is applied to extrapolation techniques. In particular, to Asymptotic Error bounds and numerical quadratures. It is then shown that the general results carry over to the numerical integration of ordinary differential equations and to eigenvalue problems. (Author)

AD-639 881 **Field 12A**
Not available from CFSTI.
Harvard Univ., Cambridge, Mass. Dept. of Mathematics.

FUNDAMENTAL POLYHEDRONS AND LIMIT POINT SETS OF KLEINIAN GROUPS,
by Lars V. Ahlfors. 16 Dec 65, 7p
Contract AF 49 (638)-1591
Proj. AF-9749
Task 974902
AFOSR-66-0654
Availability: Published in The Proceedings of the National Academy of Sciences v55 n2 p251-4 Feb 1966.

Descriptors: (*Groups (Mathematics), *Set theory), Potential theory, Topology, Convex sets, Boundary value problems.

Kleinian groups can be considered in the plane or in 3-space. The spatial point of view has some definite advantages. In this note the metric fundamental polyhedron is introduced. If it has a finite number of sides, it can be proved that the set of limit points has measure zero. (Author)

AD-639 882 **Field 12A**
Not available from CFSTI.
Harvard Univ., Cambridge, Mass. Dept. of Mathematics.
APPROXIMATION BY POLYNOMIALS: UNIFORM CONVERGENCE AS IMPLIED BY MEAN CONVERGENCE,
by J. L. Walsh. 24 Nov 65, 9p
Contract AF 49 (638)-1591
Proj. AF-9749
Task 974902
AFOSR-66-1515
Availability: Published in The Proceedings of the National Academy of Sciences v55 n1 p20-5 Jan 1966.

Descriptors: (*Approximation (Mathematics), *Polynomials), Sequences, Functional analysis.

The object of the note is to indicate that methods previously used for other purposes apply with appropriate modifications for deducing degree of convergence in the Tchebycheff (uniform) norm of a series of polynomials (complex domain) by using degree of convergence in the qth power mean norm of that same series. The results deduce degree of convergence on C in the Tchebycheff norm directly from degree of convergence in the qth power norm. The method of proof, of choosing various partial sums of the given series, of considering the difference of successive partial sums, of applying a convenient lemma concerning polynomials to estimate the derivatives or some other expressions of these differences, and finally summing the newly obtained sequence, is due to de la Vallee-Poussin. (Author)

AD-639 883 **Field 12A**
Not available from CFSTI.
Harvard Univ., Cambridge, Mass. Dept. of Mathematics.
HYPERBOLIC CAPACITY AND INTERPOLATING RATIONAL FUNCTIONS.
Interim rept.,
by J. L. Walsh. 6 Apr 64, 14p
Contract AF 49 (638)-1591
Proj. AF-9749
Task 974902
AFOSR-66-1512
Availability: Published in Duke Mathematical Journal v32 n3 p369-80 Sep 1965.

Descriptors: (*Approximation (Mathematics), *Functions), Set theory, Potential theory, Topology, Boundary value problems, Functional analysis.

The object of the note is twofold: (1) to establish some results concerning hyperbolic (non-euclidean) capacity of plane point sets, extending theorems due to Tsuji and Pommerenke and (2) apply these results in the study of interpolation and approximation by rational functions, including in particular the concept of maximal (greatest geometric degree of) convergence. The sequence of theorems developed is largely the hyperbolic analog of the discussion previously developed by Walsh, Feketi et al. (Author)

AD-639 884 **Field 12A**
Not available from CFSTI.
Harvard Univ., Cambridge, Mass.
THE CONVERGENCE OF SEQUENCES OF RATIONAL FUNCTIONS OF BEST APPROXIMATION WITH SOME FREE POLES,
by J. L. Walsh. 1965, 17p
Contract AF 49 (638)-1591
Proj. AF-9749
Task 974902
AFOSR66-1517
Availability: Published in Approximation of Functions p1-16 1965.

Descriptors: (*Sequences, *Functions), (*Approximation (Mathematics), Functions), Polynomials, Set theory, Topology, Functional analysis.

Various results concerning the convergence of sequences of rational functions of best approximation with some free poles prescribed and others free, with reference both to degree of approximation and regions of convergence, are brought together and unified, new ones are added, and open problems are particularly emphasized. In particular the paper discusses degrees of convergence, regions of convergence, the degree of convergence of poles, norms involving pth powers, and properties of the Pade functions. (Author)

AD-639 910 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
ON THE REPRESENTATION OF CONTINUOUS FUNCTIONS OF TWO VARIABLES WITH THE AID OF CONTINUOUS FUNCTIONS OF ONE VARIABLE.
Translation series,
by L. A. Bassalygo. 17 Aug 66, 11p TG-230-T491
Contract NOw-62-0604
TT-66-62385
Trans. of Moscow Univ. Vestnik. Seriya 1: Matematika, Mekhanika (USSR), n1 p58-63 1966.

Descriptors: (*Functional analysis, Topology), Set theory, Mapping (Transformations), USSR.

AD-639 911 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
LINEARIZATION OF THE EQUATIONS OF MOTION OF AUTONOMOUS SYSTEMS WITH THE AID OF ASYMPTOTIC POLYNOMIALS.
Translation series,
by G. O. Yaroshevich. 18 Aug 66, 7p TG-230-T497
Contract NOw-62-0604
TT-66-62386
Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Matematika (USSR), n6 (49) p176-9 1965.

Descriptors: (*Equations of motion, *Approximation (Mathematics)), (*Polynomials, Approximation (Mathematics)), Potential theory, Functional analysis, USSR.

An effective method is proposed in this paper for constructing the fundamental harmonic of the solution of the nonlinear equation of motion of an autonomous system and a suitable stability criterion is proved. The method is based on the apparatus of approximation of functions recently developed by I. I. Eterman. Systems with one degree of freedom are considered. (Author)

AD-639 955 **Field 12A, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Ballistic Research Labs., Aberdeen Proving Ground, Md.
STEPWISE MULTIPLE REGRESSION STATISTICAL THEORY AND COMPUTER PROGRAM DESCRIPTION,
by Harold J. Breaux, Lloyd W. Campbell, and John C. Torrey. Jul 66, 49p BRL-R-1330
Proj. RDT/E-1P014501A14B

Descriptors: (*Programming . (Computers), *Least squares method), Correlation techniques, Theory.

Multiple regression is a least squares statistical technique for quantitatively estimating an empirical linear relationship which may exist between variables. The classical approach often encounters acute computational difficulty, especially when many variables are involved and when little is known about the form of an appropriate functional linear model to represent the data. This can be overcome by using the technique of Stepwise Multiple Regression. The basic idea of the technique is that it allows one to overestimate the complexity of the 'candidate' linear model which is to be statistically analyzed. From this model a 'statistically significant' sub-model is determined by using certain criteria of fit and tests of significance to eliminate insignificant terms. (Author)

AD-639 978 **Field 12A**
Not available from CFSTI.
Stanford Univ., Calif. Dept. of Mathematics.
HALF-ORDER DIFFERENTIALS ON RIEMANN SURFACES,
by N. S. Hawley, and M. Schiffer. 31 Jul 65, 41p
Contract AF 49 (638)-1345, Grant NSF-GP-4069
Proj. AF-9749
Task 974902
AFOSR-66-1345
Availability: Published in Acta Mathematica v115 p199-236 1966.

Descriptors: (*Differential equations, *Complex variables), Integration, Calculus of variations, Matrix algebra, Distribution theory.

Homogeneous, second order, linear, ordinary differential equations are defined in an invariant way on a Riemann surface. An investigation of these reveals the fundamental role played by differentials of order -1/2 on the Riemann surface. Differentials of order +1/2 arise when the notion of the Szego kernel is lifted from plane domains to abstract Riemann surfaces. A variational formula for the Szego kernel is given, and a period matrix associated to the Szego kernel is investigated. This period matrix is related to the Riemann period matrix by a kind of duality (not fully explored yet). Various formulae are interpreted in the well-known case of genus 1, i.e., the theory of elliptic functions. (Author)

AD-639 999 **Field 12A**
Not available from CFSTI.
Hunter Coll. of the City Univ. of New York.
BLOCK DESIGNS AND GRAPH THEORY,
by Jane W. Di Paola. 1963, 17p
Contract DA-31-124-ARO (D)-366
AROD-5800:1
Availability: Published in Journal of Combinatorial Theory v1 n1 p132-48 Jun 1966.

Descriptors: (*Graphics, *Combinatorial analysis), Experimental design, Theory.

AD-640 020 **Field 12A, 9D**
CFSTI Prices: HC$3.00 MF$0.75
Polytechnic Inst. of Brooklyn, N. Y. Microwave Research Inst.
INVARIANT ESTIMATION OF STOCHASTIC SYSTEM PARAMETERS.
Research rept.,
by Guener Suezek, and Leonard Shaw. May 66, 62p PIBMRI-1334-66
Contract DA-31-124-ARO (D)-316
Proj. DA-20014501B31E

Descriptors: (*Invariance, *Stochastic processes), Statistical functions, Information theory, Time, Series.

The report is concerned with the estimation of the statistics of a class of random processes. Properties of a new constant risk estimator of the autocorrelation function for exponentially correlated processes are studied analytically. The results are applied to computer-generated random processes and the estimates found are compared with the results of more common estimation methods, such as autoregressive estimation. The effect of increasing the amount of data and changing the input distribution is examined both analytically and experimentally. (Author)

AD-640 159 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Harvard Univ., Cambridge, Mass. Dept. of Statistics.
GENERALIZED EXCHANGEABILITY OF RANDOM VARIABLES.
Technical rept.,
by Jay R. Goldman. 30 Sep 66, 6p TR-11
Contract Nonr-1866 (37)
Proj. NR-042-097

Descriptors: (*Invariance, *Stochastic processes), Distribution functions, Permutations, Sequences.

Identifiers: Random variables.

It is shown that by weakening the type of invariance usually assumed for exchangeable random variables, the exchangeability is still preserved. (Author)

AD-640 174 **Field 12A, 20K**
CFSTI Prices: HC$3.00 MF$0.75
Vitro Labs., Silver Spring, Md.
NONSEPARABLE SOLUTIONS OF THE HELMHOLTZ WAVE EQUATION EXAMINED FOR APPLICATIONS.
Final technical rept.,
by Donald S. Mosely, and James M. Render. Jul 66, 61p Vitro TR-01944.01-1
Contract DA-44-177-AMC-342 (T)
Task 1P125901A14227
USAAVLABS-TR-66-59

Descriptors: (*Partial differential equations, Theory), Vibration, Membranes, Acoustics, Electromagnetism, Boundary value problems, Elasticity.

Identifiers: Helmholtz equation, Wave equation.

A conventional solution of the Helmholtz or time-reduced wave equation is a simple product of functions that contain one coordinate variable in each. An unbounded set of solutions that are not separable into simple products of single-variable functions has been partially examined for applicability to vibrational problems. Applications to scalar usage have been found, and illustrations including shapes and frequencies for membranes and an acoustic cavity are reported. Efforts to make application to vector usage are described, as are numerous mathematical properties that have been discovered in the course of the work. It is concluded that vibration on or within some new shapes can now be calculated exactly with functions formed of the nonseparable solutions added to separable solutions. It is also concluded that simplifications in the mathematics and additional applications await the effort. (Author)

AD-640 182 **Field 12A**
Not available from CFSTI.
Lehigh Univ., Bethlehem, Pa.
STRUCTURES AND OPERATORS ON ALMOST-HERMITIAN MANIFOLDS.
Revised ed.,
by Chuan-Chih Hsiung. 2 Jun 65, 21p
Grants AF-AFOSR-62-206, NSF-G-19137
Proj. AF-9749
Task 974902
AFOSR-66-1424
Revision of manuscript submitted 19 Jul 63. Supported in part by grant NSF-GP-1567.
Availability: Published in Transactions of the American Mathematical Society v122 n1 p136-52 Mar 1966.

Descriptors: (*Operators (Mathematics), *Algebraic topology), Matrix algebra, Theory, Complex variables.

Identifiers: Manifolds (Mathematics).

AD-640 194 **Field 12A**
Not available from CFSTI.
Pennsylvania State Univ., University Park. Dept. of Mathematics.
DOMAINS OF REGULARITY OF A HARMONIC FUNCTION DETERMINED BY THE COEFFICIENTS OF ITS POWER SERIES,
by Alan S. Cover. 1966, 22p
Grant AF-AFOSR-62-59
Proj. AF-9749
Task 974902
AFOSR-66-1498
Availability: Published in Annali di Matematica pura ed Applicata v72 ser4 p11-28 1966.

Descriptors: (*Potential theory, *Power series), Complex variables, Functions, Integrals, Harmonic analysis.

Theorems are proved which give a sufficient condition on the coefficients of a harmonic function in order that the function be regular in the domain ((x, y, z) x < A) and is singular at the point (A, 0, 0). (Author)

AD-640 208 **Field 12A**
Not available from CFSTI.
Toronto Univ. (Ontario).
TESTS OF PROBABILISTIC MODELS FOR PROPAGATION OF ROUNDOFF ERRORS,
by Thomas E. Hull, and J. R. Swenson. 1966, 10p
Grant AF-AFOSR-62-264
Proj. AF-9749
Task 974901
AFOSR-66-0667
Prepared in cooperation with Courant Inst. of Mathematical Sciences, New York Univ., N. Y., Contract AT (30-1)-1480.
Availability: Published in Communications of the ACM v9 n2 p108-13 Feb 1966.

Descriptors: (*Probability, *Errors), Numerical analysis, Tests, Ontario.

Identifiers: Round-off errors.

In any prolonged computation it is generally assumed that the accumulated effect of roundoff errors is in some sense statistical. The purpose of this paper is to give precise descriptions of certain probabilistic models for roundoff error, and then to describe a series of experiments for testing the validity of these models. It is concluded that the models are in general very good. Discrepancies are both rare and milk. The test techniques can also be used to experiment with various types of special arithmetic. (Author)

AD-640 219 **Field 12A**
Not available from CFSTI.
California Univ., Los Angeles.
PERIODS OF DIFFERENTIALS ON OPEN RIEMANN SURFACES.
by A. Marden, and B. Rodin. 23 Aug 64, 7p
Grants DA-ARO (D)-31-124-G499, NSF-G-24849
AROD-1517: 101
Availability: Published in Duke Mathematical Journal v33 n1 p103-8 Mar 1966.

Descriptors: (*Differential equations, *Complex variables), Boundary value problems, Measure theory.

The modern theory of square integrable differentials on open Riemann surfaces is due to L. Ahlfors. This theory not only solved many problems but raised new ones as well. The present paper is concerned with a problem of the latter type. Can the various classes of differentials introduced by Ahlfors be characterized by their periods in some sense. The authors obtain an affirmative answer to this question for several of the classes. As a by-product they obtain a simple proof of a very general Dirichlet principle originally due to M. Ohtsuka.

AD-640 269 **Field 12A, 6P, 14D**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
A TEST FOR THE INDEPENDENCE OF TWO RENEWAL PROCESSES,
by Sidney C. Port, and Charles Stone. Sep 66, 17p RM-5124-PR
Contract AF 49 (638)-1700

Descriptors: (*Statistical processes, Reliability), Statistical tests, Nervous system, Physiology, Failure (Mechanics), Maintenance.

This study develops a large sample test for the independence of two renewal processes. Such a test should be useful in connection with certain neurophysiological experiments and in reliability and maintenance procedures for stochastically failing equipment. (Author)

AD-640 272 **Field 12A**
Not available from CFSTI.
Duke Univ., Durham, N. C.
SECOND ORDER LINEAR AND NONLINEAR DIFFERENTIAL EQUATIONS,
by J. J. Gergen, and F. G. Dressel. 23 Apr 64, 10p
Grants AF-AFOSR-61-51, AF-AFOSR-62-162
Proj. AF-9749
Task 974901
AFOSR-66-0081
Availability: Published in Proceedings of the American Mathematical Society v16 n4 p767-73 Aug 1965.

Descriptors: (*Differential equations, Theory).

AD-640 304 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
MAXIMAL CONSISTENT FAMILIES OF TRIPLES,
by Joel Spencer. Sep 66, 20p RM-5128-PR
Contract AF 49 (638)-1700

Descriptors: (*Set theory, Experimental design), Systems engineering, Graphics.

A family F of three element subsets of an n-element set Sn is called n-consistent if the intersection of any two sets of F contain at most one element of Sn. We find maximal (in number of elements) F for all n. For certain n the F are Steiner Triple Systems. The construction of the F is constructive. Structure Theorems are given determining the graph of doublets not covered by triplets in F. (Author)

AD-640 441 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Scientific Research Labs., Seattle, Wash. Mathematics Research Lab.
A NOTE ON NON-LINEAR APPROXIMATION THEORY,
by A. A. Goldstein. Sep 66, 11p D1-82-0565, Mathematical Note-482
Also available from the author.

Descriptors: (*Functional analysis, Topology), Approximation (Mathematics), Theory.

Recently J. R. Rice ('Approximation of Functions', Elsevier Pub. Co. 1965, p. 111-133) initiated a geometrical study of non-linear approximations. This paper offers a small contribution to cer-

tain analytical aspects of mean-square non-linear approximations. One result is to exhibit a family of non-linear topological subspaces of the space C (a,b) with the mean-square metric which has a local unique best approximation property. (Author)

AD-640 479 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Purdue Univ., Lafayette, Ind. Dept. of Statistics.
SEQUENTIAL SELECTION OF THE BEST OF k POPULATIONS,
by J. J. Deely. Aug 66, 26p Mimeograph Series-91
Contract AF 33(657)-11737
Research supported in part by AEC. Prepared in cooperation with Sandia Corp., Albuquerque, N. Mex.

Descriptors: (*Population (Mathematics), *Sequential analysis), Decision theory, Selection, Optimization.

AD-640 480 **Field 12A, 13F**
CFSTI Prices: HC$2.00 MF$0.50
Purdue Univ., Lafayette, Ind. Dept. of Statistics.
TWO DIMENSIONAL SPECTRAL ANALYSIS,
by Louis J. Cote. Jul 66, 32p Mimeograph Series-83
Prepared in cooperation with Midwest Applied Science Corp., Lafayette, Ind.

Descriptors: (*Statistical analysis, *Terrain), Vehicles, Stability, Roughness, Vibration, Ground speed, Transportation, Harmonic analysis.

Identifiers: Spectral analysis.

The author presents a theoretical sketch of two dimensional stationary processes with some possible uses of their spectra. Then details are given of the statistical estimation of two dimensional spectra. Measurement errors are discussed and formulas used in computation are summarized. The major part of the work was sponsored by the Land Locomotion Laboratory of the Army Tank-Automotive Center, Warren, Michigan and appears in (AD-438 405). The measured spectra were obtained for part of a study on the traversability of open ground by vehicles sponsored by the Land Locomotion Laboratory. Most of the practical problems discussed in the present work were met in the processing of this data. Results of this study will appear in a future report of the Laboratory.

AD-640 483 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Purdue Univ., Lafayette, Ind. Dept. of Statistics.
THE QUEUE WITH POISSON INPUT AND GENERAL SERVICE TIMES, TREATED AS A BRANCHING PROCESS,
by Marcel F. Neuts. Sep 66, 35p Mimeograph Series-92
Contract Nonr-1100(26)

Descriptors: (*Queueing theory, *Stochastic processes), Distribution theory, Integral transforms.

The MG1 queue is treated as a sequence of branching processes, the duration of which constitutes a busy period. The first generation in each branching process consists of the customers present at the beginning of the busy period, the second generation consists of all customers, who arrive during the service time of the first generation, etc. When the queue becomes idle, the branching process becomes extinct. This approach permits a more elementary treatment of the MG1 queue, without use of Rouche's theorem. It provides a natural sequence of approximants to the distributions, which is considered, and it provides a simple derivation of the virtual waitingtime. The paper also considers two random variables of interest, which have not been considered hitherto. One is the total number of customers, served in (o,t), the other is the virtual age or the time already spent in the queue, by the customer is service at time t. A new imbedded semi-Markov process is considered, and a study is made of its asymptotic behavior. (Author)

AD-640 489 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Operations Research Center, Univ. of Calif., Berkeley.
DETERMINATION OF CLASS PROPERTIES OF A FINITE MARKOV CHAIN.
Research rept.,
by Lawrence D. Bodin. Sep 66, 24p ORC-66-22
Contract Nonr-3656(18)
Projs. NR-042-238, WW041

Descriptors: (*Algorithms, *Probability), Operations research, Scheduling, Graphics.

A basic problem in studying Markov Chains is the determination of the class properties in each communicating class. In this paper, two algorithms for determining class properties are presented - the first algorithm finds all the class properties while the second algorithm merely finds the set of communicating classes and their classification. Extensions of these algorithms to other problems are noted and the computational efficiency of these algorithms is described. (Author)

AD-640 494 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.75
Sylvania Electronic Systems-East, Waltham, Mass.
NONSUPERVISED ADAPTIVE DETECTION FOR MULTIVARIATE NORMAL DISTRIBUTIONS.
Final rept., Feb 65-Apr 66,
by Paul W. Cooper. Sep 66, 84p
Contract AF 30(602)-3619
Proj. AF-5581
Task 558104
RADC-TR-66-488

Descriptors: (*Decision theory, *Multivariate analysis), Statistical distributions, Matrix algebra, Pattern recognition, Detection.

Nonsupervised adaptive detection for categories described statistically by multivariate normal distributions is approached as a problem in multi-parameter estimation for a multi-modal distribution. Nonsupervised learning consists in estimating the component probability distributions of a mixture of distributions, given a sequence of samples known only to have been drawn from the over-all mixture. This report considers the two-category case involving general unequal covariance matrices and the multiple-category case for spherically symmetric distributions. The techniques provided are applicable to problems in statistical classification, pattern recognition, and signal detection. (Author)

AD-640 524 **Field 12A**
CFSTI Prices: HC$15.00 MF$5.75
Lockheed Missiles and Space Co., Sunnyvale, Calif.
A TABLE OF PERIODIC CONTINUED FRACTIONS,
by R. Kortum, and G. McNiel. 1966, 1500p

Descriptors: (*Continued fractions, *Tables).

N66-27029 **Field 12A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE GROUP OF PERMUTATIONS ON 3 LETTERS AND THE PROPER ROTATIONS OF A 3-DIMENSIONAL ORTHOGONAL FRAME.
by A. Gluckman. 3 Aug 65, 6p NASA-TM-X-56895 ,
Submitted For Publication

Descriptors: *Coordinate system, *Matrix algebra, *Rotation, Algebra, Automorphism, Coordinate, Correspondence, Dimensional, Frame, Matrix, Orthogonal, Permutation, System, Three.

For abstract, see S 04 15.

N66-27184 **Field 12A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
TRANSIENT RESPONSE FROM THE LYAPUNOV STABILITY EQUATION.
by W. G. Vogt. Jun 66, 24p NASA-TN-D-3430

Descriptors: *Liapunov function, *Stability, *Transient response, Constant, Equation, Linear, Matrix, Nonlinear, Response, System, Time, Transformation, Transient, Vector.

For abstract, see S 04 15.

N66-27679 **Field 12A**
CFSTI Prices HC$1.10 MF$0.50
Northwestern Univ., Evanston, Ill. Dept. Of Geography.
A PROBABILITY LAW OBTAINED BY COMPOUNDING THE POISSON AND HALF-NORMAL PROBABILITY LAWS TECHNICAL REPORT NO. 4.
by M. F. Dacey. Dec 65, 10p NASA-CR-75674, AD-631725
Contract NONR-1228/35/

Descriptors: *Poisson distribution, *Probability theory, *Statistical probability, Discrete, Distribution, Geography, Half, Information, Law, Normal, Probability, Recursion formula, Spatial, Statistics, System, Theory, Variable.

For abstract, see S 04 15.

N66-27732 **Field 12A**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A REVIEW OF SOME EXISTING LITERATURE CONCERNING DISCONTINUOUS STATE VARIABLES IN THE CALCULUS OF VARIATIONS.
by R. E. Burns. Jun 66, 61p NASA-TN-D-3450

Descriptors: *Discontinuity, *State equation, *Variational calculus, Calculus, Clebsch theorem, Equation, Euler equation, Literature, Optimal, Review, Rocket, State, Trajectory, Transformation, Variable, Variation, Weierstrass problem.

For abstract, see S 04 15.

N66-27747 **Field 12A**
CFSTI Prices HC$2.00 MF$0.50
Emory Univ., Atlanta, Ga.
GENERAL AND ALMOST GENERAL PERIODIC FUNCTIONS.
by T. Fort. May 66, 31p NASA-CR-75455
Grant NSG-545

Descriptors: *Difference equation, *Fourier series, *Periodic function, Difference, Equation, Function, General, Implicit, Mathematics, Mean, Periodic, Problem, Theorem, Value.

For abstract, see S 04 15.

N66-28009 **Field 12A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Manned Spacecraft Center, Houston, Tex.
AN ITERATIVE METHOD FOR COMPUTING THE GENERALIZED INVERSE OF A MATRIX.
by H. P. Decell Jr, and S. W. Kahng. Jun 66, 18p NASA-TN-D-3464

Descriptors: *Eigenvalue, *Iterative solution, *Matrix algebra, Algebra, Algorithm, Calcula-

tion, Convergence, General, Hilbert space, Inverse, Iteration, Matrix, Proof, Solution, Theorem.

For abstract, see S 04 15.

N66-28044 **Field 12A**
CFSTI Prices HC$3.00 MF$0.75
Research Triangle Inst., Durham, N. C.
DEVELOPMENT OF RELIABILITY METHODOLOGY FOR SYSTEMS ENGINEERING. VOLUME III - THEORETICAL INVESTIGATIONS - AN APPROACH TO A CLASS OF RELIABILITY PROBLEMS FINAL REPORT.
by J. D. Cryer, and M. R. Leadbetter. Apr 66, 97p NASA-CR-75672
Contract NASW-905

Descriptors: *Probability, *Reliability, *Stochastic process, Barrier, Chebyshev approximation, Continuous, Crossing, Distribution, Formula, Mathematics, Process, Random, Stochastic, Theory, Time.

For abstract, see S 04 15.

N66-28152 **Field 12A**
CFSTI Prices HC$3.00 MF$0.75
Ministero Della Difesa Aeronautica (Italy).
PERTURBATIONS OF ARTIFICIAL SATELLITE ORBITS.
Le Perturbazioni Dell'orbita Dei Satelliti Artificiali
by S. Giorgi. 1965, 65p
In Italian, English Summary Its Monografie Sci. E Tech. Di Aeron. No. 25

Descriptors: *Orbital motion, *Partial differential equation, *Satellite perturbation, Artificial, Differential, Earth, Equation, Motion, Orbit, Orbital, Parameter, Partial, Perturbation, Satellite, Space, System, Zone.

For abstract, see S 04 15.

N66-28206 **Field 12A**
CFSTI Prices HC$1.00 MF$0.50
Osterreichische Studiengesellschaft Fur Atomenergie G.m.b.h., Seibersdorf (Austria). Reaktorzentrum.
MEASUREMENTS OF THE PB-210 SHELL STRUCTURE WITH HARMONIC OSCILLATOR WAVE FUNCTIONS.
Pb-210, Schalenmodellrechnungen Mit Harmonischen Oszillatorwellenfunktionen
by H. V. Geramb, G. Hertenberger, and G. Steinbach. 1966, 14p SGAE-PH-37/1966
In German Submitted For Publication

Descriptors: *Energy level, *Harmonic oscillator, *Isotope, *Lead, *Shell, *Wave function, Breakdown, Configuration, Energy, Form, Function, Harmonic, Level, Mixture, Oscillator, Potential, Structure, Wave.

For abstract, see S 04 15.

N66-28498 **Field 12A**
CFSTI Prices HC$1.00 MF$0.50
Brown Univ., Providence, R. I.
A CLASS OF LINEAR FUNCTIONAL EQUATIONS.
by J. K. Hale. 1966, 15p NASA-CR-75725
Contracts NGR-40-002-015, DA-31-124-ARO-D-270
Presented At The Intern. Congr., Moscow, Aug. 1966

Descriptors: *Differential equation, *Functional integration, *Linear equation, Algebra, Autonomy, Difference, Equation, Function, Integration, Linearity, Summary, Variable.

For abstract, see S 04 16.

N66-28506 **Field 12A**
CFSTI Prices HC$1.00 MF$0.50
Brown Univ., Providence, R. I. Center For Dynamical Systems.
ON AN APPROXIMATION THEOREM OF KUPKA AND SMALE.
by M. M. Peixoto. 1964, 25p NASA-CR-75734
Contracts NGR-40-002-015, NSF GP-4632

Descriptors: *Differential equation, *Geometry, *Manifold, *Theorem proving, Approximation, Closed, Differential, Equation, Field, Orbit, Proof, Riemann space, Theorem, Topology, Vector.

For abstract, see S 04 16.

N66-29569 **Field 12A**
CFSTI Prices HC$1.00 MF$0.50
Minnesota Univ., Minneapolis.
AN ENGINEERING APPROACH TO NONLINEAR ESTIMATION.
by J. H. Park Jr. 1965, 22p NASA-CR-75892
Grant NSG-712

Descriptors: *Approximation method, *Computer method, *Digital simulation, *Nonlinear system, Amplitude, Analog, Computer, Digital, Frequency, Function, Linear, Method, Modulation, Nonlinear, Parameter, Signal, Simulation, Space, System.

For abstract, see S 04 16.

N66-29572 **Field 12A**
CFSTI Prices HC$3.00 MF$0.75
Maryland Univ., College Park. Computer Science Center.
PARTIALLY ORDERED SPACES AND NEWTON'S METHOD FOR CONVEX OPERATORS.
by J. S. Vandergraft. May 66, 81p NASA-CR-75898, TR-66-29
Grant NSG-398

Descriptors: *Linear system, *Newton theory, *Topology, Computer, Convexity, Linear, Newton, Operator, Science, System, Theory.

For abstract, see S 04 16.

N66-29573 **Field 12A**
CFSTI Prices HC$3.00 MF$0.75
Maryland Univ., College Park. Computer Science Center.
AN EMPIRICAL EVALUATION OF THE EFFECTS OF VIOLATING THE ASSUMPTION OF HOMOGENEITY OF COVARIANCE FOR THE REPEATED MEASURES DESIGN OF THE ANALYSIS OF VARIANCE.
by P. H. Stoloff. May 66, 79p NASA-CR-75900, TR-66-28
Grant NSG-398

Descriptors: *Degree of freedom, *Homogeneity, *Statistical analysis, *Variance, Analysis, Covariance, Degree, Distribution, Empirical, Freedom, Matrix, Mean, Model, Population, Psychology, Sample, Statistical.

For abstract, see S 04 16.

N66-29731 **Field 12A**
CFSTI Prices HC$1.00 MF$0.50
Maryland Univ., College Park. Computer Science Center.
ORTHOGONAL POLYNOMIALS ON A FINITE POINTSET.
by C. K. Mesztenyi. May 66, 24p NASA-CR-75993, TR-66-30
Grant NSG-398

Descriptors: *Algorithm, *Orthogonal function, *Polynomial, *Set theory, Function, Mathematics, Orthogonal, Relation, Set, Theory.

For abstract, see S 04 16.

N66-29736 **Field 12A**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration Langley Research Center, Langley Station, Va.
AN ACCURACY STUDY OF CENTRAL FINITE DIFFERENCE METHODS IN SECOND ORDER BOUNDARY VALUE PROBLEMS.
by N. J. Cyrus. Jun 66, 80p NASA-TM-X-5769

Descriptors: *Boundary value problem, *Difference equation, *Error, *Taylor theorem, Boundary, Difference, Differential, Equation, Mathematics, Perturbation, Problem, Series, Theorem, Value.

For abstract, see S 04 16.

N66-29809 **Field 12A**
CFSTI Prices HC$1.00 MF$0.50
Pisa Univ. (Italy).
THE MINIMUM PRINCIPLE IN THE CALCULUS OF VARIATIONS..
Il Principio Di Minimo Nel Calcolo Delle Variazioni
by G. Stampacchia. 1964, 23p AFOSR-65-1031, AD-619541
Contract AF-EOAR-63-29
In Italian, English Summary

Descriptors: *Elliptic equation, *Partial differential equation, *Variational calculus, Calculus, Differential, Ellipse, Equation, Mathematics, Minimum, Optimization, Partial, Principle, Variation.

For abstract, see S 04 16.

N66-29975 **Field 12A**
CFSTI Prices HC$2.00 MF$0.50
Brown Univ., Providence, R. I. Center For Dynamical Systems.
OPTICAL STATIONARY CONTROL OF A LINEAR SYSTEM WITH STATE-DEPENDENT NOISE.
by W. M. Wonham. Jun 66, 30p NASA-CR-76085, CDS-TR-66-2
Contracts NGR-40-002-015, AF-AFOSR-693-66

Descriptors: *Control system, *Gaussian noise, *Linear system, *Optimal control, *Stochastic process, Control, Dependence, Differential, Equation, Linear, Matrix, Optimal, Process, State, Stationary, Stochastic, System, Theory.

For abstract, see S 04 16.

N66-35735 **Field 12A**
CFSTI Prices HC$1.00 MF$0.50
Pittsburgh Univ., Pa. Space Research Coordination Center.
A CLASS OF RELATED SPACE-TIMES.
by A. H. Thompson. 29 Oct 65, 9p NASA-CR-68887, SRCC-17
Grant NSG-416
Submitted For Publication

Descriptors: *Riemann space, *Space-time metric, Dimension, Equation, Field, Four, Metric, Minkowski theory, Relation, Solution, Space, Tensor, Tensor field, Time, Vacuum, Vector.

For abstract, see S 04 21.

N66-35770 **Field 12A**
CFSTI Prices HC$2.00 MF$0.50
Denver Univ., Colo. Dept. Of Chemical Engineering.
ERRORS INCURRED IN THE REDUCTION AND MATHEMATICAL MODELING OF PROCESS DYNAMIC DATA FINAL REPORT.
by R. G. Justice. Jun 66, 34p NASA-CR-77605, DRI-2333
Grant NSG-518

Descriptors: *Computer programming, *Data reduction, *Error function, *Fluid mechanics.

*Mathematical model, Computer, Data, Differential, Dissipation, Dynamic, Equation, Error, Flow, Fluid, Function, Injection, Mathematics, Mechanics, Model, Partial, Programming, Reduction, Solution, Tracer, Tube.

For abstract, see S 04 21.

N66-35783 Field 12A
CFSTI Prices HC$1.00 MF$0.50
Florida State Univ., Tallahassee. Dept. Of Statistics.
A NEWTON-GRADIENT METHOD FOR NONLINEAR PROBLEMS IN HILBERT SPACE TECHNICAL REPORT NO. 7.
by D. A. Meeter. 24 Aug 66, 16p NASA-CR-77682
Contract NGR-10-004-029

Descriptors: *Hilbert space, *Newton theory, *Nonlinear equation, *Steepest descent method, *Theorem proving, Algorithm, Descent, Equation, Gradient, Least, Method, Newton, Nonlinear, Proving, Space, Square, Steepness, Theory.

For abstract, see S 04 21.

N66-36053 Field 12A
CFSTI Prices HC$4.00 MF$1.00
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
STUDY OF RANDOM PROCESS THEORY FINAL REPORT, 1 JUL. 1965 - 1 APR. 1966.
by C. J. Greaves. Jun 66, 119p NASA-CR-77875, XM-1970-B-2
Contract NAS8-11346

Descriptors: *Autocorrelation, *Data processing, *Random process, Application, Computer, Data, Discrete, Nonstationary, Optimum, Processing, Random, Smoothing, Stationary, Technique, Theory.

For abstract, see S 04 21.

N66-36078 Field 12A
CFSTI Prices HC$2.00 MF$0.50
Maryland Univ., College Park. Computer Science Center.
MONOTONE ITERATIONS FOR NONLINEAR EQUATIONS WITH APPLICATION TO GAUSS-SEIDEL METHODS.
by J. M. Ortega, and W. C. Rheinboldt. Jul 66, 44p NASA-CR-77762, TR-66-32
Grant NSG-398

Descriptors: *Gauss function, *Iteration, *Nonlinear equation, Approximation, Boundary, Equation, Gauss, Monotone, Nonlinear, Problem, Solution, System, Value.

For abstract, see S 04 21.

N66-36114 Field 12A
CFSTI Prices HC$2.50 MF$0.75
Lockheed Missiles And Space Co., Palo Alto, Calif.
STUDY OF PERTURBED PERIODIC SYSTEMS OF DIFFERENTIAL EQUATIONS - THE STROBOSCOPIC METHOD.
by R. J. Dickson, A. F. Feinstein, T. R. Jenkins, W. E. Johnson, and C. M. Petty. Sep 66, 58p NASA-CR-583
Contract NAS7-382

Descriptors: *Differential equation, *Periodic function, Convergence, Differential, Equation, Function, Periodic, Perturbation, Solution, Stroboscope, System, Theorem, Theory, Transformation.

For abstract, see S 04 21.

N66-36133 Field 12A
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
VARIATIONAL PROBLEMS AND THEIR SOLUTION BY THE ADJOINT METHOD.
by R. R. Burrows. 9 May 66, 69p NASA-TM-X-53459

Descriptors: *Boundary value problem, *Problem solving, *Variational calculus, Adjoint, Boundary, Calculus, Flight, Mathematics, Mechanics, Method, Point, Problem, Solution, Two, Value, Variation.

For abstract, see S 04 21.

N66-36323 Field 12A
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ESTIMATION IN THE NEGATIVE BINOMIAL DISTRIBUTION.
by A. C. Cohen Jr. 21 Dec 65, 38p NASA-TM-X-53372
Contract NAS8-11175
Research Done By Georgia Univ.

Descriptors: *Binomial coefficient, *Frequency distribution, *Probability distribution, Binomial, Coefficient, Distribution, Estimation, Estimator, Frequency, Function, Moment, Negative, Parameter, Probability, Procedure.

For abstract, see S 04 21.

N66-36409 Field 12A
CFSTI Prices HC$3.00 MF$1.00
Innsbruck Univ. (Austria).
SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS BY MEANS OF LIE SERIES.
by F. Cap, D. Floriani, W. Groebner, A. Schett, and J. Weil. Aug 66, 134p NASA-CR-552
Contract NGR-52-046-001

Descriptors: *Differential equation, *Helmholtz equation, *Laplace transform, *Lie group, *Physics, Coordinate, Cylinder, Differential, Equation, Function, Linear, Mathematics, Mathieu function, Parabolic, System.

For abstract, see S 04 21.

ORNL-3986 Field 12A
CFSTI Prices: HC$3.00 MF$0.50
Oak Ridge National Lab., Tenn.
AN EXPLICIT MODIFIED MULTISTET METHOD FOR THE NUMERICAL INTEGRATION OF ORDINARY DIFFERENTIAL EQUATIONS,
by Millard T. Harkrider. Jul 66, 52p
Contract W-7405-eng-26

Descriptors: (*Numerical methods and procedures, Integration), (*Integration, *Differential equations).

For abstract, see N 20 19.

PB-173 068 Field 12A
CFSTI Prices: HC$1.10 MF$0.50
Bunker-Ramo Corp., Canoga Park, Calif.
A CORRELATION COEFFICIENT FOR ATTRIBUTES OR EVENTS,
by H. P. Edmundson. 1960, 4p
NSF Scientific Documentation Project.

Descriptors: (*Correlation techniques, Statistical functions), Probability, Set theory, Mathematical logic, Special functions (Mathematical).

The paper examines a correlation coefficient R (A, B), for attributes or events A and B, which measures their probabilistic interrelation in a quantitative way. By means of indicator functions it is shown that the correlation coefficient R (A, B) is a special case of the classical correlation coefficient R (X, Y) for random variables X and Y, and hence, is a special case of Pearson's mean square contingency phi squared for a two-by-two contingency table. (Author)

PB-173 318 Field 12A, 8I
CFSTI Prices: HC$3.00 MF$0.75
Bureau of Mines, Washington, D. C.
SOME GENERALIZED PROBABILITY DISTRIBUTIONS WITH SPECIAL REFERENCE TO THE MINERAL INDUSTRIES. PART I. SAMPLING TO N ITEMS PER SAMPLE,
by Robert M. Becker. 1964, 59p RI-6329
See also PB-173 319, PB-173 320, PB-173 321, and PB-173 322.

Descriptors: (*Special functions (Mathematical), Minerals), (*Sampling, Statistical distributions), Functional analysis, Functions, Stochastic processes, Population (Mathematics), Mathematical models, Quality control.

Identifiers: Mineral industries.

The investigation extends the theory of sample reliability from a sample consisting of a fixed number of items to a sample consisting of a fixed amount of items. Examples of a fixed amount of items per sample are samples consisting of a fixed weight or a fixed volume of unequal size particles. The extension of the theory is confirmed by experimental laboratory sampling using standard procedures. The probability distribution functions (the binomial, hypergeometric, multinomial, generalized hypergeometric, and those called the compound binomial and compound multimomial functions) are developed from fundamentals. Their distributions are generalized to include some measured characteristic of the items. Infinite population moments are derived from moment-generating functions, and finite population moments are developed from corresponding infinite population moments using a newly defined mathematical operation. The first three experimental moments in laboratory sampling to given weights of particles are compared with the theoretical moments of their corresponding compound multinomial distributions. The agreement is striking. The study is divided into five parts. Part I deals with probability or random sampling to n items and with all sampling to n items per sample from some one probability distribution. This is the area of sampling covered by well-known theory. Accordingly, the procedures may be different but many of the results are well known. (Author)

PB-173 319 Field 12A, 8I
CFSTI Prices: HC$4.00 MF$0.75
Bureau of Mines, Washington, D. C.
SOME GENERALIZED PROBABILITY DISTRIBUTIONS WITH SPECIAL REFERENCE TO THE MINERAL INDUSTRIES. PART 2. SAMPLING TO LAMBDA AMOUNT OF ITEMS PER SAMPLE,
by Robert M. Becker. 1964, 105p RI-6552
See also PB-173 318.

Descriptors: (*Special functions (Mathematical), Minerals), (*Sampling, Probability), Volume, Functions, Stochastic processes, Analysis of variance, Statistical distributions, Population (Mathematics), Quality control.

Identifiers: Mineral industries.

The report presents the mathematical development in extending the theory of sample reliability from a sample consisting of a fixed number of items to a sample consisting of a fixed amount of items. Examples of a fixed amount of items per sample are samples consisting of a fixed weight or a fixed volume of unequal size particles. The probability distribution functions (those here called the compound binomial and compound multinomial functions) are developed from fundamentals. Their distributions are generalized to include some measured characteristic of the items. Infinite population moments are derived from moment-generating functions, while finite population moments are developed from corresponding infinite population moments using the finite probability operator defined in part 1. (Author)

PB-173 320 **Field 12A, 9B, 8I**
CFSTI Prices: HC$3.00 MF$0.75
Bureau of Mines, Washington, D. C.
SOME GENERALIZED PROBABILITY DISTRIBUTIONS WITH SPECIAL REFERENCE TO THE MINERAL INDUSTRIES. PART 3. COMPUTER PROGRAMS OF DISTRIBUTION MOMENTS,
by Robert M. Becker. 1965, 84p RI-6598
See also PB-173 319.

Descriptors: (*Special functions (Mathematical), Minerals), (*Programming (Computers), Statistical distributions), Sampling, Probability, Distribution functions, Population (Mathematics), Exponential functions.

Identifiers: Mineral industries.

The report presents computer programs for evaluating moments and moment relationships of the generalized probability distributions extended or developed in parts 1 and 2 (PB-173 318 and PB-173 319). The principal program is for evaluating the first three moments and moment relationships of the compound-multinomial distribution for finite as well as for infinite populations. This is the generalized distribution for sampling to some amount of items per sample. Another program is for evaluating the first four moments, the moments of the mean, and the moment relationships of the multinomial and generalized hypergeometric distributions. This is a general moment program in sampling to some number of items per sample or for sampling to some number of samples. This program will accept either ungrouped data, frequency data, or probability data. (Author)

PB-173 321 **Field 12A, 8I**
CFSTI Prices: HC$3.00 MF$0.75
Bureau of Mines, Washington, D. C.
SOME GENERALIZED PROBABILITY DISTRIBUTIONS WITH SPECIAL REFERENCE TO THE MINERAL INDUSTRIES. PART 4. EXPERIMENTAL CONFIRMATION,
by Robert M. Becker. 1965, 62p RI-6627
See also PB-173 320.

Descriptors: (*Special functions (Mathematical), Minerals), (*Sampling, Probability), Statistical distributions, Population (Mathematics), Quanlity control, Functions, Magnetite, Pyrites, Specific gravity, Density.

Identifiers: Mineral industries.

Particle mixtures were sampled in the laboratory, using ordinary sampling procedures, to determine whether or not the compound-multinomial probability distribution and other developments of part 2 (PB-173 319) agreed with experimental results. The objective was accomplished by the Bureau of Mines by comparing the moments and moment relationships of the appropriate probability models with their corresponding experimental values over a fairly wide range. The overall agreement between the corresponding theoretical and experimental values is both good and complete. The results demonstrate that sampling to a constant amount, such as weight, of items per sample is not the same, in general, as sampling to some constant number of items per sample. The results seem to confirm all the developments of part 2 and the application of the compound-multinomial function to bulk sampling. (Author)

PB-173 322 **Field 12A, 8I**
CFSTI Prices: HC$3.00 MF$0.75
Bureau of Mines, Washington, D. C.
SOME GENERALIZED PROBABILITY DISTRIBUTIONS WITH SPECIAL REFERENCE TO THE MINERAL INDUSTRIES. PART 5. THEORETICAL CONFIRMATION AND APPLICATIONS,
by Robert M. Becker. 1966, 65p RI-6768
See also PB-173 321.

Descriptors: (*Special functions (Mathematical), Minerals), (*Sampling, *Ores), Quality control, Probability, Statistical distribution, Analysis of variance, Coal.

Identifiers: Mineral industries.

Part 5 deals with the theoretical confirmation and application of results developed in parts 1 and 2. (PB-173 318 and PB-173 319) The bulk-sampling variances of Hassialis and Kassel and Guy are compared with those in part 2, both as to formulation and as applied to ores and coal. The results provide confirmation for much of the development in part 2. Examples are presented for determining the reliability of bulk samples with respect to various measurable characteristics. These characteristics include, for example, assays for elements or compounds and particle surface area. The bulk samples considered consist either of a given weight, a given volume, or a given number of particles. In addition to problems of sample reliability, some of these examples may also be applicable to quality control. Several possible applications of results developed in parts 1 and 2 are outlined. These include tests for random data, degree-of-mixing indices, and particle-fineness indices. (Author)

AD-467 695 **See Field 8C**

AD-639 647 **See Field 5J**

AD-639 651 **See Field 20J**

AD-639 655 **See Field 13H**

AD-639 656 **See Field 5J**

AD-639 657 **See Field 5J**

AD-639 661 **See Field 20F**

AD-639 749 **See Field 7D**

AD-639 880 **See Field 20J**

AD-639 920 **See Field 17I**

AD-639 987 **See Field 4B**

AD-640 005 **See Field 5I**

AD-640 094 **See Field 5J**

AD-640 217 **See Field 5J**

AD-640 228 **See Field 20D**

AD-640 244 **See Field 20D**

AD-640 445 **See Field 20D**

AD-640 474 **See Field 20M**

AD-640 525 **See Field 19D**

UCRL-14931 **See Field 9B**

12B. OPERATIONS RESEARCH

AD-639 672 **Field 12B**
CFSTI Prices: HC$1.00 MF$0.50
Operations Research Center, Univ. of Calif., Berkeley.
MULTI-COMMODITY NETWORK SOLUTIONS.
Research rept.,
by William S. Jewell. Sep 66, 18p ORC-66-23
Contracts Nonr-222 (83), DA-31-124-ARO (D)-331
Proj. NR-047-033
Presented at the International Seminar on Graph Theory and Its Applications sponsored by International Computation Center, Rome, Italy, 5-9 July 1966.

Descriptors: (*Operations research, *Combinatorial analysis), (*Linear programming, *Graphics), Networks.

Multicommodity network flow problems have rational optimal solutions, in general, because the constraint matrix is not unimodular. Thus, all algorithms proposed to date require solving the equivalent of a general linear program in order to allocate the mutual capacities correctly, and it is here that fractional solutions may arise. This paper attempts to characterize the nature of these rational solutions by presenting several conjectures about the 'modularity' of multicommodity flow problems. Fundamental differences between the directed- and undirected-arc case are revealed, as well as the important role played by individual capacity constraints. Further investigation seems to require the development of new combinatorial and graph-theoretic methods. (Author)

AD-639 702 **Field 12B, 1C**
CFSTI Prices: HC$4.00 MF$1.00
Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
STATE INCREMENT DYNAMIC PROGRAMMING APPLIED TO STOCHASTIC AND ADAPTIVE OPTIMIZATION PROBLEMS.
Master's thesis,
by Robert E. Heath II, and John C. Koger. Jun 66, 142p GGC/EE/66-12

Descriptors: (*Dynamic programming, Optimization), (*Stochastic processes, Dynamic programming), (*Adaptive control systems, *Optimization).

Identifiers: Theses.

Dr. R. E. Larson has proposed an optimization technique, state increment dynamic programming, which reduces the fast digital computer memory requirment of conventional dynamic programming while retaining its many desirable features. The primary modification in state increment dynamic programming is that, instead of a fixed time of application of control as in conventional dynamic programming, the duration of application of control is selected as the time such that no state changes by more than one increment. This guarantees that the state resulting from the application of a control lies in a small neighborhood of the original state. Consequently, the entire region of state space is divided into smaller units called 'blocks.' The smaller amount of information contained in one of these blocks, as compared with the entire region of state space, accounts for the reduction in the fast memory requirement. State increment dynamic programming is applied to stochastic optimization problems in which the stochastic variable is a set of values each with a known discrete probability. The equations are presented in a form suitable for a digital computer solution.

AD-639 703 **Field 12B, 14D, 9A**
CFSTI Prices: HC$4.00 MF$0.75
Illinois Univ., Urbana. Coordinated Science Lab.
A STUDY OF SYSTEM RELIABILITY USING TOPOLOGICAL METHODS,
by Glenn H. Stumpff. Aug 66, 113p R-300
Contracts DA-28-043-AMC-00073 (E), AF 33 (608)-1237
Proj. DA-20014501B31F

Descriptors: (*Topology, *Reliability (Electronics)), Systems engineering, Operations research, Graphics, Functions.

Identifiers: Theses.

This dissertation is primarily concerned with monotonic or coherent systems which operate whenever one or more subsets of their elements operate simultaneously. The algebraic structure of the system reliability function, R sub s, when written in terms of the variables representing the reliabilities of elements in the system, is investigated. In particular -- for systems having reliability models which can be represented by weighted linear graphs or nets, and for which the subsets of simultaneously operating elements correspond to paths between two nodes of the net -- a number of interesting relationships between R sub s and the topology of its corresponding net are proven.

AD-639 704 Field 12B, 9C
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Stanford Electronics Labs.
THE INVERSE PROBLEM OF OPTIMAL CONTROL.
Technical rept.,
by B. D. O. Anderson. Apr 66, 36p TR-6560-3, SEL-66-038
Contract Nonr-225 (83)
Proj. NR-373-360

Descriptors: (*Optimization, *Control), Linear systems, Sensitivity, Design, Feedback, Control systems.

The relation is explored between linear feedback laws chosen to reduce the sensitivity of a linear time-invariant system to plant parameter variations, and linear feedback laws derived on an optimal control basis from quadratic loss functions. A general equivalence between the two types of design is established for multiple-input, multiple-output systems. The sensitivity improvement can be calculated for optimally design systems, and a quadratic loss function can be found for a system designed to reduce the sensitivity to plant parameter variations. (Author)

AD-639 705 Field 12B, 9B
CFSTI Prices: HC$3.00 MF$0.75
Stanford Univ., Calif. Stanford Electronics Labs.
SEQUENTIAL DECISION AND CONTROL PROBLEMS IN SNAKE FORMS.
Technical rept.,
by Tom G. Sharpe. Jun 66, 82p TR-6151-1, SEL-66-049
Contract Nonr-225 (83)
Proj. NR-373-360

Descriptors: (*Decision theory, Geometric forms), Sequential analysis, Control, Artificial intelligence, Motion.

Identifiers: Snake forms.

The report is a study of properties and problems in multilink chains, or snake forms, biological snakes are not considered. The study deals primarily with geometric and kinematic details of movements of snake forms. The problem of general concern is that of placing the head of the snake on a given target. Subproblems arise as various schemes of target acquisition are discussed. Topics considered include minimax (in maximum curvature sense) snakes, sequential control, black box snakes (determining state from error measurements), path constrained target approach, minimum time target approach, binary (two position angle) snakes and adaptive target approach. It is found that the minimax convex snake with equal link lengths has the appearance of a piecewise linear approximation to an arc of a circle plus a straight line segment. Also, a sequential control scheme is developed that will carry the head to the target with a finite number of angle changes. (Author)

AD-639 720 Field 12B, 5A
CFSTI Prices: HC$1.00 MF$0.50
Stanford Univ., Calif. Dept. of Statistics.
A MARKOVIAN DECISION MODEL FOR A JOINT REPLACEMENT AND STOCKING PROBLEM.
Technical rept.,
by Cyrus Derman, and Gerald J. Lieberman. 9 Sep 66, 22p TR-93
Contract Nonr-225 (53)
Proj. NR-042-002

Descriptors: (*Inventory control, *Mathematical models), Replacement theory, Stock level control, Statistical analysis, Optimization.

Two important classes of problems encountered by industry and government are those dealing with replacement policies and ordering policies. These problems are usually treated separately. A particular model which treats the replacement and stocking problems as one is considered in this report. It is formulated as a denumerable state Markovian decision model. It is shown that the optimal decision policy has a particular structure. In attaining the optimal policy, this structure is exploited so that an optimal policy can be obtained in a finite number of steps. (Author)

AD-639 774 Field 12B
Not available from CFSTI.
Rice Univ., Houston, Tex.
A PRIMAL (ALL-INTEGER) INTEGER PROGRAMMING ALGORITHM. PART I. A PRIMAL ALGORITHM: ANTECEDENTS, GOALS, AND PROBLEMS,
by Richard D. Young. 12 Jun 65, 38p
Prepared for presentation at the Advanced Study Institute on Integer Programming and Network Flow, Tahoe City, Calif., July 1 to August 21, 1965.
Availability: Published in Journal of Research of the National Bureau of Standards -B. Mathematics and Mathematical Physics v69B n3 p213-50 Jul-Sep 1965.

Descriptors: (*Algorithms, *Linear programming), Numbers, Theorems, Optimization.

Identifiers: Integer programming.

The algorithm is most closely related to three existing procedures; the simplex method of G. B. Dantzig for linear programming problems, the Gomory all-integer integer programming algorithm, and the direct algorithm for integer programming of Ben-Israel and Charnes. The algorithm is similar to the Gomory all-integer algorithm in these respects: (i) it is an all-integer algorithm; (ii) it uses the same cut generation procedure; (iii) it uses the cut row as the pivot row; and (iv) the pivot coefficient always has unit value. While the dual method provides the vehicle for moving from tableau to tableau in the Gomory all-integer algorithm, the simplex method has the analagous role in the primal algorithm. Thus in a general sense this algorithm is a primal analog to the (dual) Gomory all-integer algorithm. The direct algorithm of Ben-Israel and Charnes also has the above similarities to the Gomory all-integer algorithm, but has one significant difference: an iteration or cycle of the direct algorithm must frequently include the solution of an 'auxiliary problem' (which is itself an integer programming problem) or a determination that no solution to the 'auxiliary problem' exists. In contrast the cycles of the primal algorithm include only the adjoining of a Gomory cut and the execution of the change of basis procedure of the simplex method. The procedure of the algorithm and the proof of finiteness are founded on a classification of cycles of the algorithm and on two theorems. (Author)

AD-639 810 Field 12B
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Dept. of Statistics.
CHANCE-CONSTRAINED PROGRAMMING WITH 0-1 OR BOUNDED DECISION VARIABLES.
Technical rept.,
by Frederick S. Hillier. 26 Aug 66, 48p TR-92
Contracts Nonr-225 (53), Nonr-225 (89)
Projs. NR-042-002, NR-047-061

Descriptors: (*Linear programming, Uncertainty), (*Decision theory, Linear programming), Stochastic processes.

Identifiers: Chance-constrained programming.

The paper considers the chance-constrained programming problem where the decision variables can be either bounded and continuous or restricted to be either zero or one, and where some or all of the elements of A, b, and c are random variables that may be statistically dependent. Both exact and approximate solution procedures are presented, where most of these are based on several linear inequalities that permit this problem to be approximated by a number of ordinary (integer or noninteger) linear programming problems. Either zero-order or linear decision rules are allowed for the continuous variables, and a general method of making 'second-stage decisions' with either continuous or 0-1 variables is developed. (Author)

AD-640 134 Field 12B
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
THE NORM OF A CLOSED TECHNOLOGY AND THE STRAIGHT-DOWN-THE-TURNPIKE THEOREM,
by Sidney G. Winter Jr. Sep 66, 38p P-3454

Descriptors: (*Theorems, *Operations research), Production control, Mathematical models.

Identifiers: Turnpike theorem.

AD-640 136 Field 12B, 14D, 1B
CFSTI Prices: HC$2.00 MF$0.50
Boeing Scientific Research Labs., Seattle, Wash. Mathematics Research Lab.
ON THE DETERMINATION OF A SAFE LIFE FOR CLASSES OF DISTRIBUTIONS CLASSIFIED BY FAILURE RATE,
by Sam C. Saunders. Jun 66, 30p D1-82-0540, Mathematical Note-469
Also available from the author.

Descriptors: (*Failure (Mechanics), *Fleets), Aircraft, Structural parts, Statistical analysis, Reliability.

Using a lower tolerance bound as the derated life provides a guaranteed service period with the confidence level as a measure of safety in situations where mass production is contemplated. However, when only a limited number of items are to be produced, the probability of no failures among the fleet of specified size provides a better measure of assurance. Assuming that the life distribution is one of a specified set of subclasses of those distributions which have increasing failure rates we find those derating functions which can be used to provide lower tolerance bounds of given confidence or a safe service life with specified fleet assurance. A method of finding such derating functions is exhibited and the calculation of a lower bound for the probability of no failure in the fleet is carried out when such derating functions are used. The confidence in the tolerance bound and the assurance of no fleet failure are compared when using bounds obtained from these derating functions. (Author)

AD-640 175 Field 12B
CFSTI Prices: HC$4.00 MF$0.75
Operations Research Center, Univ. of Calif., Berkeley.
ON A GROUP THEORETIC APPROACH TO LINEAR INTEGER PROGRAMMING.
Technical rept.,
by William W. White. Sep 66, 104p ORC-66-27
Contract DA-31-124-ARO (D)-331
Proj. DA-20014501B14C
AROD-5307.17

Descriptors: (*Groups (Mathematics), *Linear programming), Algorithms, Optimization, Numbers.

Identifiers: Integer programming.

The paper extends some results of Gomory on a group theoretic approach to linear integer programming. An algorithm for solving integer programming problems is presented, and the relation of this work to cuts and appropriate geometric interpretations are given. The theoretical basis for the algorithm establishes a characterization of integer solutions to linear programs by considering the Gomory column group associated with the optimal linear programming basis. It is shown that

if an optimal integer solution exists, it can be obtained by finding the rth optimal solution to an optimization problem over elements in this Gomory group, for some finite r. A dynamic programming procedure for finding this rth optimal solution is given, and shown to be equivalent to finding an rth shortest route through a specially constructed network. A particular class of cutting planes is discussed. These cuts are shown to be parallel to a subset of Gomory cuts and at least as strong as the Gomory cuts. Specially structured integer programs are discussed with a view toward speeding computation. Included in this discussion is a specialization to zero-one variables. Some computational results are given. It is seen that computational efficiency depends crucially on the size of the absolute value of the determinant of the optimal linear programming basis. In general, the smaller this absolute value, the more efficient the algorithm. (Author)

AD-640 215 **Field 12B**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Univ., Calif. Dept. of Industrial Engineering.
AN OPTIMAL BOUND-AND-SCAN ALGORITHM FOR INTEGER LINEAR PROGRAMMING.
Technical rept.,
by Frederick S. Hillier. 19 Aug 66, 78p TR-3
Contract Nonr-225 (89), Grant NSF-GP-3739
Proj. NR-047-061

Descriptors: (*Algorithms, *Linear programming), Optimization, Numbers.

Identifiers: Integer programming.

A new algorithm for solving the pure integer linear programming problem is presented and evaluated. Roughly speaking this algorithm proceeds by obtaining tight bounds or conditional bounds on the relevant values of the respective variables, and then identifying a sequence of constantly improving feasible solutions by scanning the relevant solutions. Encouraging computational experience is reported that suggests that this algorithm should compare favorably in efficiency with existing algorithms. Plans for investigating ways of further increasing the efficiency of the algorithm and of extending it to more general problems also are outlined. (Author)

AD-640 218 **Field 12B**
Not available from CFSTI.
California Univ., Los Angeles. Dept. of Engineering.
CONTROL OF A LINEAR SYSTEM WITH A MARKOV PROPERTY.
Revised ed.,
by David D. Sworder. 31 Mar 65, 10p
Grant AF-AFOSR-62-68
AFOSR-66-0390
Revision of manuscript submitted 13 Nov 64.
Availability: Published in IEEE Transactions on Automatic Control vAC10 n3 p294-300 Jul 1965.

Descriptors: (*Control systems, Synthesis), (*Statistical analysis, Control systems), Game theory, Decision theory, Linear systems, Optimization.

The theory of games and statistical decisions is applied to the problem of synthesizing a controller for a linear discrete time plant in the presence of uncertainty about the value of certain process parameters. Particular care is taken to describe how these unknown parameters complicate the choice of the properties of an optimal control rule. The theory is illustrated by the study of the characteristics of a second-order system. (Author)

AD-640 264 **Field 12B**
CFSTI Prices: HC$2.00 MF$0.50
California Univ., Berkeley. Dept. of Mathematics.
A QUASI-GRADIENT METHOD IN CONVEX PROGRAMMING.
Technical rept.,
by H. J. Bremermann, and H. De Grasse. Mar 66, 38p
Contract Nonr-222 (85)
Proj. NR-049-170

Descriptors: (*Nonlinear programming, Saddle point method), Convex sets, Iterative methods.

Identifiers: Convex programming.

AD-640 382 **Field 12B**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Dept. of Industrial Engineering.
EFFICIENT SUBOPTIMAL ALGORITHMS FOR INTEGER LINEAR PROGRAMMING WITH AN INTERIOR.
Technical rept.,
by Frederick S. Hillier. 12 Aug 66, 45p TR-2
Contract Nonr-225 (89), Grant NSF-GP-3739
Proj. NR-047-061

Descriptors: (*Algorithms, *Linear programming), Effectiveness, Operations research.

Identifiers: Integer programming.

The paper presents and evaluates some new suboptimal algorithms for the pure integer linear programming problem having only inequality constraints. The computation time required by these algorithms (after obtaining the optimal noninteger solution) has been only a small fraction of that required by the simplex method. Furthermore, the solution obtained by the better algorithms consistently has been close to optimal and frequently has actually been optimal. Plans for generalizing these algorithms also are outlined. A companion paper presents an optimal 'bound-and-scan' algorithm that would be used in conjunction with these suboptimal algorithms. (Author)

N66-27964 **Field 12B**
CFSTI Prices HC$2.00 MF$0.50
Stanford Univ., Calif. Dept. Of Statistics.
TWO-ACTION COMPOUND DECISION PROBLEMS TECHNICAL REPORT NO. 87.
by M. V. Johns Jr. 11 Mar 66, 36p NASA-CR-75532
Contract NONR-225/53/
Sponsored By Nasa

Descriptors: *Asymptotic method, *Decision theory, Acceptance, Action, Asymptote, Compound, Cost, Decision, Distribution, Linear, Mathematics, Method, Optimal, Probability, Sampling, Structure, Theory, Two.

For abstract, see S 04 15.

N66-36262 **Field 12B**
CFSTI Prices HC$2.00 MF$0.50
Rand Corp., Santa Monica, Calif.
A BAYESIAN APPROACH TO RELIABILITY ASSESSMENT.
by B. L. Fox. Aug 66, 27p NASA-CR-77910, RM-5084-NASA
Contract NASR-21/11/

Descriptors: *Apollo project, *Bayesian statistics, *Reliability, *System failure, Analysis, Assessment, Component, Distribution, Engineering, Estimation, Failure, Parameter, Rate, Statistics, System.

For abstract, see S 04 21.

PB-173 270 **Field 12B**
CFSTI Prices: HC$3.00 MF$0.50
Rice Univ., Houston, Tex.
A SIMPLIFIED PRIMAL (ALL-INTEGER) INTEGER PROGRAMMING ALGORITHM.
Research rept.,
by Richard D. Young. Sep 66, 52p
Grant NSF-GU-1153

Descriptors: (*Algorithms, *Linear programming), Numbers.

Identifiers: Integer programming.

An (all integer) integer programming algorithm is described. The algorithm starts with and maintains a primal-feasible tableau. The procedure of the algorithm depends on a two-way classification of the cycles of the algorithm that distinguishes between transition cycles (which actually result in a new solution) and stationary cycles (which do not change the solution). For both cycle types, comparatively simple rules are given for selection of the incoming variable and of the source row for generation of a Gomory cut. These procedures are shown to yield a finite algorithm. (Author)

AD-639 693 See Field 1C

AD-639 698 See Field 9C

AD-639 801 See Field 15C

AD-639 921 See Field 15A

AD-640 207 See Field 5A

AD-640 233 See Field 5A

AD-640 478 See Field 5C

PB-173 207 See Field 5A

PB-173 208 See Field 5A

13A. AIR CONDITIONING, HEATING, LIGHTING, AND VENTILATING

AD-477 479 **Field 13A**
CFSTI Prices: HC$3.00 MF$0.75
Carrier Air Conditioning Co., Syracuse, N. Y. Military Equipment Dept.
THERMOELECTRIC ENVIRONMENTAL CONTROL UNIT.
Final engineering design rept.,
by G. D. Hudelson, G. K. Gable, and A. A. Beck. 27 Sep 65, 86p
Contract DA-44-009-AMC-1135 (T)
Proj. DA-1D-643303-D545
Task 1D-643303-D54503

Descriptors: (*Heat exchangers, *Thermoelectricity), (*Air conditioning systems, Thermoelectricity), (*Temperature control, Thermoelectricity), Environment, Cooling, Cooling + ventilating systems, Circuits, Fans.

Identifiers: Thermoelectric heat pumps.

A detailed engineering design is presented for a 24,000 Btu/hr Thermoelectric Environmental Control Unit. System design is based on an optimization analysis performed on an analog computer. Procedures followed and results obtained are described. Twelve design parameters were optimized for minimum weight and maximum efficiency. System is 28 in. wide x 18 in. deep x 63 in. high, weighs 380 lbs. and operates at an overall C.O.P. (including fans) of 1.12 with a net cooling capacity of 24,000 Btu/hr at design operating conditions. Dual frequency (60 and 400 cps) fans are used. Power rectifier furnishes 3 phase, full wave dc power without voltage transformation. Modulated capacity control is provided from full cooling to full heating as required by system load. The design is based on air-to-air heat exchange utilizing aluminum heat transfer surface. Operating instructions, maintenance procedures, manufacturing procedures and cost analysis information are included. Recommendation is made to develop a prototype unit. (Author)

AD-477 483 **Field 13A**
CFSTI Prices: HC$3.00 MF$0.75
Westinghouse Electric Corp., Cheswick, Pa.

THERMOELECTRIC ENVIRONMENTAL CONTROL UNIT.
Final rept.,
by R. E. Stillwagon, G. T. Kartsounes, and W. P. Briley. 8 Oct 65, 93p Engineering Memo-3515
Contract DA-44-009-AMC-1136 (T)
Proj. DA-IM643303D545

Descriptors: (*Air conditioning equipment, Design), (*Thermoelectricity, Air conditioning equipment), Cooling, Heating, Energy conversion, Control systems.

An engineering design program was conducted for a thermoelectric environmental control unit. The unit capacity is 24,000 BTU/hr. in the cooling mode when operating in 120F ambient air. The unit is self contained, transportable and includes power conversion and automatic thermostatic control for both cooling and heating. The final design is a result of design studies to optimize over-all system performance consistent with volume, weight, and cost considerations.

AD-477 492 **Field 13A**
CFSTI Prices: HC$3.00 MF$0.75
Garrett Corp., Los Angeles, Calif. Airesearch Mfg. Div.
DETAILED ENGINEERING DESIGN THERMOELECTRIC ENVIRONMENTAL CONTROL UNIT.
Design rept. (final),
by Colvin J. Bertrem, Frank H. Fujimoto, Charles H. LaFranchi, Landon A. Stratton, and Anthony V. Vilona. 12 Nov 65, 82p L-8028-Rev-1
Contract DA-44-009-AMC-1137 (T)
Proj. DA-1D643303D545

Descriptors: (*Heat exchangers, *Thermoelectricity), (*Air conditioning equipment, Thermoelectricity), (*Cooling + ventilating systems, Thermoelectricity), Environment, Control systems, Power supplies, Fans, Inverter, Rectifiers, Temperature control.

Identifiers: Thermoelectric heat pumps.

The report describes a detailed engineering design of a thermoelectric environmental control unit (ECU). The ECU is a complete self-supporting unit that requires only a 115 vac, 3 phase, 60 or 400 cycle electrical power input. Besides the thermoelectric heat exchanger, the ECU has an ac to dc power converter, a 60 to 400 cycle frequency inverter, a thermal control system, a malfunction detection and protection system, 3 fans and a master control panel that can be removed for remote operation. At design point, the ECU has a cooling capacity of two refrigeration tons (24,000 Btu/hr). A requirement was to design a unit with an overall operational system coefficient of performance (COP) of one or greater at design point. The report describes an ECU with a system COP of 1.10. The ECU is an air to air unit designed for ground operation. (Author)

AD-640 026 **See Field 13K**

13B. CIVIL ENGINEERING

AD-639 710 **Field 13B, 15C**
CFSTI Prices: HC$4.00 MF$0.75
Engineering-Science, Inc., Arcadia, Calif.
A PROTOTYPE MANUAL ON CIVIL DEFENSE ASPECTS OF WATERWORKS OPERATIONS, PHASE II.
Final rept.,
by Judson A. Harmon. Sep 66, 105p
Contract OCD-PS-65-15
USNRDL-TRC-65

Descriptors: (*Pipes, Nuclear explosion damage), (*Water supplies, *Civil defense systems), Instruction manuals, Blast, Decontamination, Vulnerability, Management planning, Civil defense personnel, Fallout shelters.

The study presents information on the blast vulnerability of community water distribution pipelines, alternate operating techniques for controlling the use of water in early postattack periods, and on radiological recovery procedures and shelters available to waterworks personnel. The results of the analysis of the vulnerability of pipelines indicate that the primary mode of failure will be crushing of the pipe. The five principal alternate operating techniques considered are: (1) isolation of portions of the distribution system; (2) rationing consumer water use; (3) reducing hydrostatic operating pressures; (4) rerouting water; and (5) the utilization of auxiliary sources of water. Planning is stressed for postattack radiological recovery procedures, such as, wet decontamination and the determination of the safe stay times for recovery personnel. It is essential to provide shelter in locations as close as possible to the designated tasks that waterworks personnel must perform in early postattack recovery situations. (Author)

PB-172 455 **Field 13B, 7B**
CFSTI Prices: HC$4.00 MF$1.00
Public Health Service, Cincinnati, Ohio. Div. of Water Supply and Pollution Control.
WATER METALS NO. 3, STUDY NUMBER 23,
by Raymond J. Lishka. 1965, 146p PHS-Pub-999-WP-36

Descriptors: (*Water, *Chemical analysis), (*Metals, Chemical analysis), Test methods, Chemical indicators, Spectroscopy, Standardization, Effectiveness, Water pollution, Aluminum, Copper, Iron, Manganese, Zinc, Silver, Cadmium, Chromium, Lead.

Seventy-nine participating laboratories were instructed to dilute the provided concentrated water sample to a specified volume and analyze for nine specified metals. In their analyses for cadmium, lead, silver, and zinc, participants were instructed to use new methods to appear in the 12th edition of 'Standard Methods for the Examination of Water and Wastewater', which were provided with the sample. The desirability of the various chemical methods are compared and discussed. The few participants using atomic absorption spectroscopy achieved excellent results for all metals except aluminum, which was not measured by this method. Use of the spectrograph produced good results for zinc and cadmium, but appeared less satisfactory for the analysis of aluminum, silver, chromium, lead, copper, iron, and manganese.

PB-173 131 **Field 13B**
CFSTI Prices: HC$1.60 MF$0.50
Public Health Service, Washington, D. C.
AIR POLLUTION-TIME FOR ACTION,
by William H. Stewart. Jun 66, 16p
Presented at Annual Meeting of Air Pollution Control Association (59th), San Francisco, Calif., 20 Jun 66.

Descriptors: (*Air pollution, Control), United States Government, Public health, Federal budgets, Urban areas, Symposia.

PB-173 132 **Field 13B**
CFSTI Prices: HC$1.60 MF$0.50
Department of Health, Education, and Welfare, Washington, D. C.
AIR POLLUTION: CLUBWOMEN ACCEPT THE CHALLENGE,
by Thomas F. Williams. Jun 66, 18p
Presented at the Annual Meeting of the General Federation of Women's Clubs (75th), Conrad Hilton Hotel, Chicago, Ill., 9 Jun 66.

Descriptors: (*Air pollution, Control), Urban areas, Public health, United States Government, Symposia.

PB-173 153 **Field 13B**
CFSTI Prices: HC$2.00 MF$0.50
Chicago Area Expressway Surveillance Project, Oak Park, Ill.
HEADWAY GROUPINGS,
by Patrick Athol. Jan 65, 38p Rept. no. 14
Presented at Annual Meeting, Highway Research Board (44th), Sheraton-Park Hotel, Washington, D. C., January 11-15, 1965.

Descriptors: (*Roads, Traffic), (*Traffic, Theory), Vehicles, Density, Time, Distribution, Numerical analysis, Illinois.

The purpose of the paper is the investigation of time headways between successive vehicles on a multilane freeway. The vehicle headways were classified into two categories: platoons (those vehicles traveling at headways equal to or less than a value; called the platoon definition), and groups (those vehicles traveling at headways greater than the platoon definition). Several different platoon definitions are used with tests conducted on the distribution of platoon sizes, headways within a platoon, headways between successive platoons, and relative proportion of platoon vehicles with respect to volume. Investigation is also made of the relationship between headways and volumes, and a maximum volume for various platoon definitions is developed.

PB-173 157 **Field 13B**
CFSTI Prices: HC$1.00 MF$0.50
Chicago Area Expressway Surveillance Project, Oak Park, Ill.
A STATISTICAL ANALYSIS OF SPEED-DENSITY HYPOTHESES,
by J. Drake, J. Schofer, and A. May. 14 Sep 65, 6p
A summary of PB-173 158.

Descriptors: (*Roads, Traffic), (*Traffic, Theory), Vehicles, Velocity, Density, Equations, Mathematical models, Statistical analysis, Illinois.

Data was collected on the Eisenhower Expressway to test and evaluate seven different speed-density models: the Greenshields, Greenberg, Underwood, Edie, 2-Regime Linear, 3-Regime Linear, and Bell Curve models. Statistical procedures were implemented to determine break-points in multi-regime regression analyses. The Edie formulation gave the most satisfying estimates of the fundamental parameters. The standard error of estimate was found to be the most consistent statistical measure for both single-regime and multi-regime hypotheses.

PB-173 158 **Field 13B**
CFSTI Prices: HC$3.00 MF$0.75
Chicago Area Expressway Surveillance Project, Oak Park, Ill.
A STATISTICAL ANALYSIS OF SPEED DENSITY HYPOTHESES,
by Joseph S. Drake, Joseph L. Schofer, and Adolf D. May Jr. May 65, 88p Rept. no. 16
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Roads, Traffic), (*Traffic, Theory), Vehicles, Velocity, Density, Equations, Mathematical models, Statistical analysis, Illinois.

Data were collected on the Eisenhower Expressway to test and evaluate seven different speed density models: the Greenshields, Greenberg, Underwood, Edie, 2-Regime Linear, 3-Regime Linear, and Bell Curve models. Statistical procedures were implemented to determine break-points in multi-regime regression analyses. The Edie formulation proved to fit the data better than the other models. The standard error of estimate was found to be the consistent statistical measure for both single-regime and multi-regime hypotheses.

PB-173 162 **Field 13B**
CFSTI Prices: HC$1.00 MF$0.50
Oregon State Highway Dept. Traffic Engineering Div.
CONGESTION ANALYSIS - SPEED DELAY STUDY, US99W I-5, PORTLAND, OREGON.
Dec 65, 16p

Descriptors: (*Roads, Oregon), (*Traffic, Analysis), (*Oregon, Traffic), Construction, Accidents, Vehicles, Velocity.

Data were collected on the Pacific Highway West, US99W, from the Tigard Interchange into Portland, Oregon, before and after the construction of the Pacific Highway Freeway to determine the effect of construction of a freeway on the congestion, travel time and accident rates on the route paralleling the freeway. Traffic congestion, travel times, and accident rates during peak periods decreased on Pacific Highway West after construction of the Pacific Highway Freeway. (Author)

PB-173 278 **Field 13B, 13F**
CFSTI Prices: HC$4.00 MF$0.75
Texas Transportation Inst., Texas A and M Univ., College Station.
IMPACT BEHAVIOR OF SIGN SUPPORTS-II.
Staff progress rept.,
by Neilon J. Rowan. Sep 65, 118p Research rept. RR-68-2, Rept. no. 432
Proj. 2-5-63-68
Report on Sign Support Structures. Prepared in cooperation with Texas Highway Dept., and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Vehicles, Impact tests), (*Supports, *Impact tests), Safety devices, Motor vehicle accidents, Photographic analysis, Rods, Pipes, Mathematical models, Texas.

Identifiers: Highway signs.

The report describes studies involving the impact behavior of certain types of sign supports. Part A is based on observations of motion picture films of 27 crash tests conducted during the second year of research encompassing several different types of sign supports. Following a description of crash test procedures is a section describing the tests on small gore type signs each consisting of two supports with a 5-foot by 6-foot sign. The slip bases used were either horizontal or inclined at 10 degrees. All but two of the tests were conducted on steel support posts. The final two tests were conducted on wood post supports, one of which was a Pennsylvania design and the other a TTI design. Some preliminary tests of mechanical fuses were performed in order to determine the feasibility of using a notched plate instead of a cast iron plate for the mechanical fuse. Single and dual pipe supports for small signs were tested with slip bases in horizontal position and inclined at 10 and 20 degrees. Part B describes six full-scale crash tests which provided highspeed motion picture records, accelerometer records, and electric resistance strain gage records. The development of a mathematical model expressing the support post behavior is described. (Author)

PB-173 279 **Field 13B, 13M, 11I**
CFSTI Prices: HC$5.00 MF$1.00
Nebraska State Dept. of Roads.
EFFECT OF BRIDGE DECK INSULATION ON ICING CONDITIONS,
by G. L. Downey, and R. T. Delorm. 19 Apr 66, 175p Rept. no. 0445
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Bridges, Thermal insulation), (*Ice, Bridges), Plastic coatings, Nebraska, Roads, Freezing, Melting, Isocyanate plastics, Meteorological parameters.

Conclusions: Problems may exist in the bond of 'sprayed on' urethane foam to concrete. The 3/4-inch urethane foam insulation is consistently as effective or more effective than the 1 1/4-inch insulation in maintaining slightly high slab temperatures during the critical frost period. Between girders, both thicknesses of urethane foam insulation show an average beneficial delay of freezing at the beginning of the night freezing period. Over the girders, the 1 1/4-inch insulation slab generally went into freezing before the uninsulated slab and the 3/4-inch insulation had little average effect. For thawing, at the end of the night freezing period, the 3/4 - inch insulation was ineffective and the 1 1/4 - inch insulation produced average detrimental delay. The urethane foam insulation was generally ineffective in reducing the occurrence of freeze-thaw cycles in the bridge slab concrete or in reducing the duration of the daily freeze period. While there may be a small overall beneficial effect from the urethane foam insulation in reducing the severity of frost and icing conditions, the inconsistency of the day-to-day effects greatly reduces any value that it might have as a method for the prevention of frost and icing conditions on bridges.

PB-173 285 **Field 13B, 13F**
CFSTI Prices: HC$3.00 MF$0.75
California State Div. of Highways.
THE EFFECT OF RAMP TYPE AND GEOMETRY ON ACCIDENTS,
by R. A. Lundy. 25 May 65, 84p Rept. no. 200
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Roads, *Motor vehicle accidents), Geometric forms, Traffic, Statistical analysis, Design, California.

Identifiers: Highway ramps.

A three-year study of 722 freeway ramps carrying over 2-billion vehicles on which 1643 accidents occurred was undertaken to investigate the geometric features which play important roles in ramp safety and to classify these geometric features by ramp type and relative safety measures. The study included classification of ramp type and presented the results of correlations between accident rates and various geometric and non-geometric considerations. A basic assumption made was that ramp experience is essentially related to the number of vehicles using the ramp without regard to the distance travelled. The 722 study ramps, of which 32 percent were accident-free, experienced 18 percent of the accidents occurring on the freeways which they served. Generally, it was concluded that design differences of the ramps studied did not play a significant role when comparisons were made of accident-free ramps and those ramps with accidents. It was found, however, that the off-ramp accident rates were consistently higher than the on-ramp accident rates, the differences being attributed primarily to the difference in number of single-vehicle accidents occurring on the ramps. It was also considered that acceleration lanes of 800 feet or greater and deceleration lanes of 900 feet or greater result in lower accident rates than shorter speed-change lanes. (Author)

AD-640 444 **See Field 21B**

NBS-TN-339 **See Field 20N**

PB-170 929 **See Field 7A**

PB-172 452 **See Field 8G**

PB-173 264 **See Field 8M**

PB-173 265 **See Field 8M**

PB-173 272 **See Field 13M**

PB-173 274 **See Field 13M**

PB-173 276 **See Field 13M**

PB-173 282 **See Field 13M**

PB-173 283 **See Field 11B**

PB-173 284 **See Field 8M**

PB-173 328 **See Field 13L**

PB-173 355 **See Field 13M**

PB-173 360 **See Field 13M**

13C. CONSTRUCTION EQUIPMENT, MATERIALS, AND SUPPLIES

AD-427 303 **Field 13C**
CFSTI Price: HC$5.60
Aircraft Armaments, Inc., Cockeysville, Md.
INSTRUCTIONS AND OPERATIONS MANUAL FOR RAPID EMPLACEMENT AND RETRIEVING DEVICE FOR GROUND STAKES GP-112 G ANF GP-113/G. BALLISTIC HAMMER MX-6321 ( )/G.
Summary rept. (Appendix),
by R. G. Strickland. 15 Jan 64, 52p ER-3246
Contract DA-36-039-sc-90760 (E)
See also AD-427 305.

Descriptors: (*Hammers, Instruction manuals), Anchors (Structural), Soils, Penetration, Cartriges, Operation, Maintenance.

Identifiers: Ballistic hammers, MX-6321.

The purpose of the instructions is to completely familiarize the technically oriented operator with the Ballistic Hammer. This device has been developed to enable the rapid, easy emplacement and retrieval of Signal Corps Ground Stakes GP-113/G and GP-112/G. The instruction book contains sections which discuss operating principles, component descriptions and functions, disassembly and cleaning procedures, and detailed operation procedures for the device both when used as an emplacement device and when used as a retrieve device for the two Ground Stakes. Wherever possible, illustrations are used to facilitate the understanding of the operations. (Author)

PB-172 451 **See Field 8G**

13D. CONTAINERS AND PACKAGING

AD-639 662 **Field 13D**
CFSTI Prices: HC$1.00 MF$0.50
Army Weapons Command, Rock Island, Ill. Research and Engineering Div.
TWELVE YEAR VCI INDOOR STORAGE PROTECTION TEST.
Technical rept.,
by R. L. LeMar, and P. Martin. Jul 66, 22p
Proj. DA-1C024401A109
R1A-66-2130

Descriptors: (*Packing materials, Corrosion inhibition), (*Storage, Tests), Paper, Steel, Degradation, Aging (Materials), Effectiveness, Performance (Engineering).

The protective ability of Volatile Corrosion Inhibitor (VCI) materials is related to both the chemical type and amount of inhibitor present. Since these materials are volatile they can be lost from unsealed packages during storage. To investigate the effects of inhibitor loss, steel specimens were wrapped with fresh and aged VCI paper and placed in indoor storage for 12 years. At test conclusion; (1) the steel specimens were examined for corrosion, (2) the VCI papers were analyzed for inhibitor content and physical properties and (3) the steel specimens were evaluated for corrosion resistance after removal from the package. Test results indicated one VCI material had provided excellent protection for 12 years. Two other papers had provided nominal protection for this period. No trace of VCI chemical was found on any of the papers. Two VCI papers met burst and tear strength requirements of MIL-P-3420 specification after test. The steel specimens removed from the test packages corroded more rapidly in high humidity tests than did similar specimens not previously exposed to VCI. It was concluded that thorough sealing is not required for all VCI packages under indoor storage conditions when no liquid water is produced by condensation inside the package. VCI preserved items should be used or represerved immediately after removal from a package. (Author)

AD-640 456 Field 13D
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
EVALUATION OF MULTIPURPOSE CONTAINERS,
by D. R. Agnew. 17 May 66, 8p NAEC-AML-2438

Descriptors: (*Containers, Transportation), Performance (Engineering), Aluminum, Storage, Acceptability, Steel.

Conclusions: The information received via questionnaires tends to indicate that the containers are satisfactory but the information received in response to a follow-up indicates that there is much dissatisfaction with both types of containers. It is recommended that no changes be made to the current procurement policy of twist-lock, aluminum drawn and the bolt and ring containers.

PB-173 061 Field 13D, 6H
CFSTI Price: HC$1.00
National Bureau of Standards, Washington, D. C. Inst. for Applied Technology.
FLEXIBLE, TRANSPARENT PACKAGING MATERIALS.
Jul 66, 20p OTR-139

Descriptors: (*Packaging, Reviews), (*Containers, Military rations), Bags (Containers), Plastics, Films, Preservation, Food, Irradiated food, Corrosion resistance, Bibliographies, Packing materials.

Significant reports covering the period since 1960 were selected for this study, with reference to relevant earlier works. Recent Government-sponsored research and development (R and D) in flexible transparent packaging materials has resulted from (1) efforts to develop materials which meet military requirements and applications, (2) the U. S. Department of Agriculture's continuing and extensive program for improving the transportation and marketing of agricultural products and, (3) studies on packaging requirements for radiation-preserved foods. Considerable progress was made in each of these areas. Military specifications were developed which define the required properties of flexible transparent films and bags for packaging applications. Improved packaging and handling of agricultural products in transparent films were derived from the USDA's extensive research and marketing studies. These improvements have provided enormous benefits to the marketing of agricultural products. Important progress was made in developing flexible packages for radiation-preserved foods. (Author)

AD-640 252 See Field 14B

AD-640 273 See Field 11I

UCRL-14903 See Field 18G

13E. COUPLINGS, FITTINGS, FASTENERS, AND JOINTS

AD-639 953 Field 13E, 13J
CFSTI Prices: HC$2.00 MF$0.50
Navy Marine Engineering Lab., Annapolis, Md.
MECHANICAL SHOCK RESISTANCE OF THREADED FASTENERS.
Research and development rept.
by John R. Braden, and Richard E. Heise Jr. Oct 66, 36p MEL-412/66
Proj. S-R007-09-02
Task 0857

Descriptors: (*Mechanical fasteners, Shock resistance), Submarine hulls, Studs, Locking fastener devices, Nickel alloys, Copper alloys.

An investigation was made of the mechanical shock resistance of K-Monel full-body studs set in HY-80 steel under various conditions. Strain gages mounted on the stud shanks were used to measure dynamic loading. Elastic nylon-insert monel stop nuts were used throughout the test. The data indicated that for the conditions of the test Locktite-coated 3A-3B threads are equal in shock resistance to uncoated 5A-5B threads, and that the elastic stop nuts are reusable after repeated shock. (Author)

13F. GROUND TRANSPORTATION EQUIPMENT

AD-482 752 Field 13F
CFSTI Prices: HC$1.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
DIGITAL SIMULATION OF TRAFFIC FLOW WITH APPLICATION TO RAILWAY TRAIN MOVEMENTS.
Technical rept.,
by K. N. Dodd, J. Hawkes, and R. P. Muddle. Jan 66, 19p TR-66004

Descriptors: (*Railroads, Management engineering), Great Britain, Feasibility studies, Digital computers, Models (Simulations), Transportation, Management control systems, Simulation, Railroad cars, Traffic, Air traffic.

This report describes an initial investigation into the feasibility of simulating railway train movements in a general purpose digital computer, using techniques which were developed for studies of air traffic movements. In the cases considered, it has been found possible to represent train movements with a high degree of realism using a relatively simple model. A programme has been made to apply the method to the Dartford area. (Author)

PB-173 145 Field 13F
CFSTI Prices: HC$1.60 MF$0.50
Japanese National Railways, Tokyo (Japan). Railway Technical Research Inst.
RAILWAY ENGINEERING ABSTRACTS 1966 VOL. 5 NO. 2.
Jun 66, 15p
Abstracts from the periodicals on Railway Engineering published in Japan. See also PB-170 843.

Descriptors: (*Railroads, Abstracts), Transportation, Safety, Civil engineering, Electricity, Locomotives, Railroad cars, Machines, Machining, Materials, Scientific research, Japan.

The publication is issued for the purpose of introducing the articles concerning railway technique written by the Japanese engineers and researchers. The abstracts, prepared in English and carried by this publication, represent the major periodicals in Japan as selected by the Center. The following subjects are included: Railway in general, Transportation, Safety, Civil engineering, Electricity, Rolling stock, Non-rail forms of transportation, Machinery, Machining, Materials, Science.

PB-173 312 Field 13F, 13L, 5E
CFSTI Prices: HC$2.00 MF$0.50
Fairchild Hiller Corp., Farmingdale, N. Y. Republic Aviation Div.
SAFETY CAR PROGRAM. FEASIBILITY STUDY,
Summary rept.
1966, 48p
Prepared in cooperation with New York State Dept. of Motor Vehicles, see also PB-173 313.

Descriptors: (*Passenger vehicles, *Safety), Feasibility studies, Design, Structural properties, Systems engineering, Seats, Vehicle chassis components, Safety devices, Performance (Engineering).

The program's ultimate goal is to design, fabricate in prototype quantity, develop, and test a 'safety car' which incorporates all practical safety devices. This report is the first step -- a study of the feasibility of the project. The next step, to be undertaken during 1966-67, involves the evaluation and analysis of materials and engineering systems and production of final vehicle design details.

PB-173 313 Field 13F, 13L, 5E
CFSTI Prices: HC$6.00 MF$1.50
Fairchild Hiller Corp., Farmingdale, N. Y. Republic Aviation Div.
SAFETY CAR PROGRAM. FEASIBILITY STUDY,
Final rept.
31 Aug 66, 273p FHR-3040-3
Prepared in cooperation with New York State Dept. of Motor Vehicles, see also PB-173 312.

Descriptors: (*Passenger vehicles, *Safety), Feasibility studies, Design, Structural properties, Systems engineering, Performance (Engineering), Safety devices, Vehicle chassis components, Cost effectiveness, Motor vehicle accidents.

The study provided much confirming detail to the general plan of the program and program objectives, and has shown points of association of the program with systems approaches to traffic safety. The two main aspects of the feasible program reported are: (1) A system of safety definitions and safety ratings, stemming from detailed performance tests, which is suitable as a basis for legislative and administrative requirements or standards, and (2) A thoroughly tested prototype safety car, demonstrating practicality of a number of advanced safety functions integrated in one producible design and specifiable for purchase or placement in the ratings system. Safety performance features and tests passed by the vehicle are graded individually and can be used as labels for a specific vehicle. Both over-all ratings and individual performance features are defined and graded so that their effects are understandable to legislators or automobile users. Existing private and public safety standards, or sections of such standards, would be employed to maintain compatability with existing industry practice wherever possible. For design purposes, safety performance features of the prototype safety car will be selected to meet a similarly chosen set of conditions of usage, again using a formal evaluation logic. It is feasible for a combination of features to be chosen for a broad usage safety car that could reduce occupant injuries and fatalities by more than one half with approximately the same degree of complexity and cost found in present day full-size low priced cars.

AD-640 374 See Field 13L

AD-640 480 See Field 12A

PB-173 278 See Field 13B

PB-173 285 See Field 13B

PB-173 328 See Field 13L

13G. HYDRAULIC AND PNEUMATIC EQUIPMENT

AD-640 293 Field 13G, 21E
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
DESIGNING TWO-CASCADE COMPRESSORS,
by A. M. Topunov, and B. A. Tikhomirov. 21 Jun 66, 16p FTD-HT-66-246
TT-66-62435
Unedited rough draft trans. of Energomashinostroenie (USSR) v11 n5 p29-32 1965.

Descriptors: (*Compressors, Design), Cascade structures, Gas turbines, USSR.

The general advantages of two-cascade compressors, the equations and the results of calculations

from the selection of parameters are introduced. (Author)

N66-27314 **Field 13G**
CFSTI Prices HC$3.00 MF$0.50
Bendix Corp., Southfield, Mich. Research Labs. Div.
FABRICATION AND TEST OF A FLUERIC POSITION SERVO QUARTERLY REPORT, 10 SEP. - 10 DEC. 1965.
1965, 58p NASA-CR-54900, BRLD-3255
Contract NAS3-6201

Descriptors: *Control device, *Nuclear rocket, *Pneumatic equipment, Actuator, Amplifier, Circuit, Control, Device, Drum, Engine, Equipment, Nuclear, Pneumatic, Rocket, Vortex.

For abstract, see S 04 15.

N66-28525 **Field 13G**
CFSTI Prices HC$2.00 MF$0.50
Case Inst. Of Tech., Cleveland, Ohio.
EXPERIMENTAL SCALING STUDY OF FLUID AMPLIFIER ELEMENTS FINAL REPORT.
by J. Abler, I. Greber, and C. Taft. 31 Mar 66, 48p
NASA-CR-75668
Contract NAS8-11267

Descriptors: *Bistable amplifier, *Boundary layer control, *Fluid amplifier, *Scaling, *Vortex, Amplifier, Bistable, Boundary, Control, Device, Flow, Fluid, Layer, Parameter, Pressure, Reynolds number, Stagnation, Static.

For abstract, see S 04 16.

N66-35938 **Field 13G**
CFSTI Prices HC$2.00 MF$0.50
Astro Research Corp., Santa Barbara, Calif.
ON THE USE OF FILAMENT WOUND TOROIDS AS PNEUMATIC SHOCK ABSORBERS.
by J. Loisch, and R. H. Mac neal. Sep 66, 49p
NASA-CR-574
Contract NASW-652

Descriptors: *Filament winding, *Pneumatic equipment, *Shock absorber, Absorber, Absorption, Behavior, Buckling, Energy, Equipment, Filament, Pneumatic, Shock, Stiffness, Toroid, Use, Winding.

For abstract, see S 04 21.

N66-36374 **Field 13G**
CFSTI Prices HC$2.00 MF$0.50
Alabama Univ., University. Bureau Of Engineering Research.
STUDY OF THE STABILITY OF THE S-IC OPEN LOOP PROPELLANT-HYDRAULIC SYSTEM QUARTERLY REPORT NO. 6.
1966, 38p NASA-CR-77907
Contract NAS8-11341

Descriptors: *Hydraulic system, *Saturn sic stage, Command, Dynamic, Feedback, Hydraulic, Input, Loop, Open, Propellant, Response, Signal, Stability, System.

For abstract, see S 04 21.

AD-640 379 **See Field 13I**

AD-640 430 **See Field 9C**

13H. INDUSTRIAL PROCESSES

AD-469 911 **Field 13H**
CFSTI Prices: HC$5.00 MF$1.00
Naval Avionics Facility, Indianapolis, Ind.
METAL CUTTING STANDARDS - TURNING AND BORING,
by Max Vinson. 1 Sep 65, 154p NAFI-TR-532

Descriptors: (*Machine tools, Machining), (*Machining, Velocity), Aluminum alloys, Magnesium alloys, Copper, Bronze, Brass, Steel, Carbon alloys, Stainless steel, Nickel alloys, Iron alloys, Titanium, Titanium alloys, Cutting tools, Life expectancy, Ductility, Finishes + finishing, power, Tables, Drilling machines, Standards.

This report provides metal cutting standards data for turning and boring operations covering a wide range of feeds, speeds, and depths of cut based on an eight-hour tool life. Information is included on surface finish and power requirements to aid in the selection of data from these tables. Although these standards were set up primarily for use on numerically controlled equipment, they will work just as well on conventional machine tools. (Author)

AD-639 654 **Field 13H, 13I**
CFSTI Prices: HC$6.00 MF$1.25
Battelle Memorial Inst., Columbus, Ohio.
MACHINING AND GRINDING OF ULTRA-HIGH-STRENGTH STEELS AND STAINLESS STEEL ALLOYS,
by C. T. Olofson, J. A. Gurklis, and F. W. Boulger. Oct 65, 214p
Contract DA-01-021-AMC-11651 (Z)
NASA-TM-X-53433, RSIC-501

Descriptors: (*Steel, *Material removal), (*Machining, Steel), (*Grinding, Steel), Stainless steel, State-of-the-art reviews, Chemical milling, Machine tools, Cutting fluids, Cutting tools, Small tools.

The report covers the state of the art of metal-removal operations for stainless and ultrahigh-strength steels. It describes the methods currently employed for conventional machining, grinding, electrolytic, electric-discharge, and chemical-machining processes. The precautions that should be taken to avoid troubles resulting from the characteristics typical of these alloys are pointed out. Nine machining, two grinding, two cutting, and three unconventional metal-removal operations are discussed separately. Other sections discuss the classification of these alloys and their general response to machining variables. (Author)

AD-639 655 **Field 13H, 12A**
CFSTI Prices: HC$2.00 MF$0.50
Florida State Univ., Tallahassee. Dept. of Statistics.
SURVEILLANCE PROBLEMS: TWO DIMENSIONAL WITH CONTINUOUS SURVEILLANCE,
by Gordon Antelman, Bradley Russell, and I. R. Savage. Jul 66, 41p FSU-Statistics-M113
Contract Nonr-988 (13)
See also AD-417 778.

Descriptors: (*Production control, Optimization), Quality control, Stochastic processes, Maintenance, Dynamic programming.

The paper is concerned with optimal strategies for controlling a two-component Poisson production process under continuous surveillance. Either or both components may be repaired at any time at some cost. The long run average cost is used as the criterion for comparing strategies. The class of stationary Markovian strategies which do not permit hesitation and which allow production on only a finite number of states is shown to be a complete class of strategies under a certain assumption of monotonicity on the income function. Properties of optimal strategies are derived and the results applied to a numerical example. (Author)

AD-639 838 **Field 13H, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Beryllium Corp., Reading, Pa.
DEVELOPMENT OF SOLID SOLUTION STRENGTHENED HIGH PURITY BERYLLIUM ALLOY SHEET.
Bi-monthly progress rept. for Jun-Jul 66, 29 Aug 66, 7p
Contract NOw-66-0563

Descriptors: (*Beryllium alloys, *Rolling (Metallurgy)), (*Sheets, Beryllium alloys), Solid solutions, Copper alloys, Extrusion, Roughness, Surface properties, Castings, Grain structures (Metallurgy).

Three beryllium plus copper alloy ingots were produced. The charges were melted under a vacuum of approximately 150 microns in a BeO coated graphite crucible. At 2460F the alloy was bottom poured into a 3-1/4 in. diameter graphite mold having a water cooled chill plug attached at the bottom. Preparatory to melting, beryllium electrolytic flake was cold compacted into cylindrical preforms to minimize melt loss. The copper was added in sections cut from electrolytic copper cathodes. The billets were encased in mild steel jackets and extruded. The extrusion was performed at 1850F using a 1/4 in. x 2-1/2 in. die which produced a 14.3:1 reduction ratio. Conclusions are: (1) Copper additions to high purity beryllium yield an alloy with good casting characteristics. (2) Only the increased extrusion forces required to extrude the alloy billets differentiated the alloy extrusions from conventional beryllium ingot extrusions. (3) The degree of surface roughness of the extruded alloy slabs was greater than the roughness of pure beryllium slabs, and this roughness could be related to the grain size variation in the casting. (Author)

AD-639 871 **Field 13H, 11F**
Not available from CFSTI.
Westinghouse Research Labs., Pittsburgh, Pa.
KINETIC EFFECTS IN TEMPERATURE GRADIENT ZONE MELTING.
Interim rept.,
by R. G. Seidensticker. 1966, 6p
Contract AF 49 (638)-1029
Proj. AF-9761
Task 976102
AFOSR-66-1634
Availability: Published in Journal of the Electrochemical Society v113 n2 p152-6 Feb 1966.

Descriptors: (*Zone melting, Dynamics), Gold, Germanium, Phase studies, Crystal lattice defects.

Experiments on the motion of liquid zones in the germanium-gold TGZM system indicate that kinetics characteristic of screw dislocations may play an important role. In many instances, dissolution rather than deposition appeared to be the rate-limiting mechanism. Finally, it was found that the motion of such zones was intrinsically unstable under some conditions. (Author)

AD-639 949 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
Army Weapons Command, Rock Island, Ill. Research and Engineering Div.
REACTIONS OF POTENTIALLY SUITABLE VCI COMPOUNDS WITH NONFERROUS METALS.
Technical rept.,
by Peter Martin Jr. Jul 66, 20p
Proj. DA-1C024401A109
RIA-66-2246

Descriptors: (*Corrosion inhibition, Compatibility), Vapor pressure, Copper, Cadmium, Magnesium, Zinc, Aluminum, Amines, Corrosion.

Restrictions currently exist in the use of volatile corrosion inhibitors (VCI) because of the adverse effects on some nonferrous metals and nonmetals. Work was initiated to develop VCI's which would be inert or passive to both nonferrous metals and nonmetals but still have the ability to vaporize to combat a corrosive environment. Possible VCI compounds were selected and their vapor pressures were measured by the Torsion-Effusion method. Vapor pressure data was obtained for amines of the nitrites, carbonates, benzoates, chro-

mates and caprylate at 21 C. Values ranged from <0.00001 to 0.0048 mm of Hg. Vapor pressure-temperature curves were determined for benzylamine carbonate and dicyclohexylamine caprylate. Reactivity tests were conducted showing the nature and intensity of the attack of the VCI compounds on nonferrous metals. The test consisted of exposing Cu, Cd, Mg, Zn and Al specimens to the VCI compounds for 7 days at 150 F. in the presence of high humidity. Weight loss measurements were used to evaluate the attack on the metals in mils penetration per year (mpy). On the basis of the results obtained the following conclusions were made. (a) Cadmium and magnesium are more severely attacked by the VCI compounds in the presence of water vapor than the other metals tested. (b) there is not one of the VCI compounds which decreases the corrosion rate of all the metals tested or which has the least corrosive effect and (c) no correlation was found between the vapor pressures and the reactivity with nonferrous metals. (Author)

AD-639 963 **Field 13H, 11K**
CFSTI Prices: HC$1.00 MF$0.50
Naval Applied Science Lab., Brooklyn, N. Y.
METHODS FOR STRIPPING COATED ANODES.
Technical progress rept.,
by I. Geld, and S. H. Davang. 3 Oct 66, 12p TR-1
Projs. 9400-33, SF-020-02-06
Task 1203

Descriptors: (*Cleaning, Anodes), (*Anodes, Cathodic protection), Paint removers, Vinyl plastics, Plastic paints, Solvents, Electrolytic polishing, Platinum, Acetones, Toluenes, Halogenated hydrocarbons.

Occasionally, platinum anodes are inadvertently painted, rendering them inoperative. Paint removal by abrasive blasting may erode the soft platinum. Electrolytic methods for stripping the Navy underwater vinyl paint system were found ineffective at applied potentials up to 20 volts and anode current densities up to about 3000 amperes per square foot. Solvents which removed vinyl paint quickly were acetone, toluene, methylene chloride, MEK, MIBK, and trichloroethylene. (Author)

AD-640 023 **Field 13H, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Army Materials Research Agency, Watertown, Mass.
HIGH SPEED DEFORMATION OF SELECTED HIGH-STRENGTH ALLOYS: EFFECT ON MECHANICAL PROPERTIES.
Technical rept.,
by Robert M. Colton, and Roger A. Gagne. Aug 66, 20p AMRA-TR-66-23
Proj. DA-1C024401A110

Descriptors: (*Titanium alloys, *Explosive forming), Mechanical properties, Deformation, Temperature, Heat treatment, Ductility.

Identifiers: Titanium alloy 6 Al 4V, Titanium alloy 6 Al 2Sn 6V, HERF.

The effect of deformation rate and temperature on the as-formed and heat-treated mechanical properties of Ti-6Al-4V and Ti-6Al-6V-2Sn were determined. In general, heat treatment removes any effect of deformation rate or temperature on the mechanical properties of both alloys, except at forming temperatures above their respective beta-transus temperature, where embrittlement is observed. The effect of strain rate on the mechanical properties is slight for Ti-6Al-4V, and quite noticeable for Ti-6Al-6V-2Sn in the as-formed condition at each forming temperature. In general, strength and ductility decrease in the as-formed condition for both alloys as the forming temperature increases for both strain rates evaluated. (Authors)

AD-640 052 **Field 13H**
CFSTI Prices: HC$2.00 MF$0.50
Springfield Armory, Mass.
DEVELOPMENTS IN THE HARMONIC ANALYSIS METHOD FOR THE NONDESTRUCTIVE DETERMINATION OF CASE DEPTH OF CARBURIZED STEEL.
Technical rept.,
by H. P. Hatch, and K. A. Fowler. 20 May 66, 26p SA-TR-19-1520
Proj. AW-5-15221
Report on magnetic and mechanical hardness tests for determining case and core properties of carburized steel parts.

Descriptors: (*Non-destructive testing, Harmonic analysis), (*Steel, Case hardening), Thickness, Hardness, Electromagnetic waves.

The investigation concerned with the nondestructive determination of case depth of carburized steel by the harmonic analysis method was continued. The test method and instrumentation used in this investigation were described in detail in a previous Springfield Armory Technical Report, SA-TR19-1514 (AD-626 602). The harmonic analysis instrument developed previously in the program was utilized to study the effect of sample dimensions, chemical analysis, and the feasibility of employing a probe-type test coil. Results of this investigation demonstrated that the method was effective for measuring deep cases through .075 inch and shallow cases on samples having small cross-sectional areas. The effect of the demagnetizing factor was found to influence only the sensitivity of results, and substantial variations in alloying elements produced only minor differences in harmonic measurements. Correlation between case depth and harmonic phase shift was similar on samples heat-treated by either the gas or liquid-carburizing process. The ability to use a probe-type test coil for measuring case depth by this method was demonstrated by a prototype design. (Author)

AD-640 210 **Field 13H, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Materials Advisory Board, NAS-NRC, Washington, D. C.
CHARACTERIZATION OF BERYLLIUM.
Aug 66, 19p MAB-226-M
Contract DA-49-083-OSA-313

Descriptors: (*Beryllium, Quality control), Processing, Hot working, Microstructure, Production control, Physical properties, Production, Reliability.

The report compiles the major process variables corresponding to the principal operations gone through in producing a beryllium mill product, and then a part. This compilation comprises a check list which should be reviewed at the start of a research or development effort to ensure that variables which might be significant are not being overlooked. The ultimate object of compiling and studying such data is to assure uniformity, and thus introduce reliability into manufactured parts. (Author)

AD-640 230 **Field 13H, 13I**
CFSTI Prices: HC$1.00 MF$0.50
Materials Advisory Board, NAS-NRC, Washington, D. C.
METALWORKING PROCESSES AND EQUIPMENT.
Progress rept. no. 4.
Sep 66, 25p MAB-206-M (4)
Contract DA-49-083-OSA-3131

Descriptors: (*Material forming, Metals), (*Dies, Forging), Design, State-of-the-art reviews.

Topics included are: (A) The use of the computer in forging die design, (B) The use of model experiments in forging die design, (C) The application of plasticity mechanics to forging die design.

AD-640 285 **Field 13H, 13I**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
HIGH-SPEED STAMPING OUT OF METALS,
by Yu P. Sogrishin, and N. F. Koyakovskii. 6 Apr 66, 11p FTD-TT-65-1372
TT-66-62427
Unedited rough draft trans. of Byulleten' Tekhniko-Ekonomicheskoi Informatsii (USSR) n9 p25-8 1964.

Descriptors: (*Forging, Metals), USSR, Forge presses, Dies, Alloys.

AD-640 376 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
Army Materials Research Agency, Watertown, Mass.
VACUUM HEAT TREATING OF HIGH-STRENGTH STEEL CASTINGS.
Technical rept.,
by Arthur Ayvazian. Aug 66, 22p AMRA-TR-66-24
Task 56131

Descriptors: (*Castings, Steel), (*Steel, Heat treatment), Vacuum apparatus, Induction heating, Silicon alloys, Refining (Metallurgy), Mechanical properties.

Identifiers: Steel 4340.

An investigation was conducted to verify the feasibility of employing vacuum heat treating as a means of improving the mechanical properties of high-strength steel castings. Eight 'octabar' AISA 4340 and 4340 + 1.30 percent silicon steel castings, four vacuum induction melted and four air induction melted, were subjected to various combinations of vacuum and conventional heat treating. The results indicated no significant tangible evidence of any increase in mechanical properties when vacuum heat treated. (Author)

N66-27044 **Field 13H**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
METHOD OF FABRICATING SILICON CARBIDE SHAPES.
Verfahren Zur Herstellung Geformter Korper Aus Siliciumcarbid
by E. Enk, and J. Nickl. Aug 63, 5p NASA-TT-F-8478
Transl. Into English From German Patent No. 1088863, 8 Sep. 1960

Descriptors: *Semiconductor, *Silicon carbide, *Vapor deposition, Carbide, Compound, Deposition, Gas, Graphite, Halide, High temperature, Hydrogen, Shape, Silicon, Vapor.

For abstract, see S 04 15.

N66-27050 **Field 13H**
CFSTI Prices HC$2.00 MF$0.50
Carbons, Inc., Boonton, N. J.
SOLAR CARBONS FINAL REPORT NO. 10.
27 Jul 65, 39p NASA-CR-65361
Contract NAS9-3698

Descriptors: *Electrode, *Physical property, *Shell stability, Arc, Artificial, Break, Burning, Carbon, Carbonaceous, Construction, Core, Crater, Discharge, Energy, Furnace, Glue, Graphite, Lamp, Machining, Physical, Property, Radiance, Scalloping, Shell, Solar, Spectral, Stability, Tabulation, Tar.

For abstract, see S 04 15.

N66-27182 **Field 13H**
CFSTI Prices HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
THE FABRICATION OF SEAMLESS TEFLON PROPELLANT EXPULSION BLADDERS.

by R. N. Porter. 15 Jun 66, 32p NASA-CR-75332, JPL-TR-32-914
Contract NAS7-100

Descriptors: *Bladder, *Plastic film, *Polytetrafluoroethylene, *Teflon, Expulsion, Fabrication, Film, Mandrel, Manufacturing, Permeability, Plastic, Propellant, Seamless, Sintering, Spraying.

For abstract, see S 04 15.

N66-27757 **Field 13H**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
VACUUM UV COATINGS, MICROCIRCUITRY WELDING, METAL POLISHING STUDY, ABSOLUTE SPECTRAL RESPONSE SYSTEM, PARABOLIC REFLECTORS, SOLDERING TO ELECTRODEPOSITED METALS QUARTERLY PROGRESS REPORT, JAN. 1 - MAR. 31, 1966.
by M. Levinsohn. 1966, 24p NASA-TM-X-57614

Descriptors: *Coating, *Optical reflectivity, *Parabolic reflector, *Polished metal, *Vacuum ultraviolet, *Welding machine, Electrode, Electrodeposition, Machine, Material, Metal, Microcircuit, Movement, Optical, Parabolic, Polishing, Reflectivity, Reflector, Response, Soldering, Spectral, Stainless, Steel, Testing, Ultraviolet, Vacuum, Welding.

For abstract, see S 04 15.

N66-28544 **Field 13H**
CFSTI Prices HC$3.00 MF$0.75
Midwest Research Inst., Kansas City, Mo.
COLD MOLECULAR WELDING STUDY IN ULTRA-HIGH VACUUM FINAL REPORT, 8 OCT. 1964 - 17 DEC. 1965.
by J. Bossert, C. E. Moeller, and M. Noland. 19 Nov 65, 88p NASA-CR-65390
Contract NAS9-3623

Descriptors: *Apollo project, *Metal working, *Ultrahigh vacuum, *Welding, Air, Coefficient, Cold, Dynamic, Friction, Metal, Molecular, Pellet, Static, Test, Ultrahigh, Vacuum, Working.

For abstract, see S 04 16.

N66-28764 **Field 13H**
CFSTI Prices HC$3.00 MF$0.50
Aerojet-general Corp., El Monte, Calif. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena. Astrionics Div.
DESIGN, FABRICATION, MODIFICATION, AND TESTING OF CRYOGENIC-SOLID COOLER, AEROJET MODEL K6 FINAL ENGINEERING REPORT.
15 Nov 65, 58p NASA-CR-75768
Contracts NAS7-100, JPL-950726
Its Rept.-2948

Descriptors: *Coolant, *Cryogenics, *Infrared detector, Cooler, Detector, Fabrication, Heat transfer, Infrared, Loading, Material, Methane, Nitrogen, Performance, Pressure, Solid, Testing.

For abstract, see S 04 16.

N66-28831 **Field 13H**
CFSTI Prices HC$2.00 MF$0.50
Tyco Labs., Inc., Waltham, Mass.
LEAD TELLURIDE NON-MAGNETIC BONDING RESEARCH STUDY FOURTH QUARTERLY REPORT, 1 DEC. 1965 - 28 FEB. 1966.
by H. E. Bates, F. Wald, and M. Weinstein. 1966, 31p NASA-CR-75804
Contract NAS5-9149

Descriptors: *Diffusion bonding, *Lead telluride, *Thermoelectric material, Alloy, Bonding, Diffusion, Electrode, Equilibrium, Lead, Material, Nonmagnetic, Telluride, Thermoelectric.

For abstract, see S 04 16.

N66-29077 **Field 13H**
CFSTI Prices HC$3.00 MF$0.50
Hughes Aircraft Co., Culver City, Calif. Materials Technology Dept.
STUDY OF SPACE ENVIRONMENT FABRICATION AND REPAIR TECHNIQUES SUMMARY REPORT, PERIOD ENDING APR. 1966.
by R. D. Engquist, and D. B. Nord. May 66, 52p NASA-CR-65402
Contract NAS9-4548

Descriptors: *Electron beam welding, *Extraterrestrial environment, *Resistance heating, *Structure, Aerospace, Beam, Electron, Energy, Environment, Evaluation, Extraterrestrial, Fabrication, Heating, Joining, Resistance, Source, Space, System, Welding.

For abstract, see S 04 16.

N66-29223 **Field 13H**
CFSTI Prices HC$2.00 MF$0.50
Aerojet-general Corp., Sacramento, Calif.
INDUCTION PROCESSED SEPARABLE TUBULAR BRAZED CONNECTORS.
by V. Hunt. Jul 66, 32p NASA-CR-515
Contract NAS3-2555
Its Rept-8800-24

Descriptors: *Brazing, *Gold alloy, *Joint, *Stainless steel, Alloy, Chamber, Fuel, Gold, Line, M- 1 rocket engine, Nickel, Pipe, Separation, Stainless, Steel, Thrust.

For abstract, see S 04 16.

N66-29543 **Field 13H**
CFSTI Prices HC$3.00 MF$0.75
Southwest Research Inst., San Antonio, Tex.
FABRICATION AND TESTING OF BATTERY SEPARATOR MATERIAL FROM MODIFIED POLYETHYLENE FINAL REPORT.
by L. M. Adams, W. W. Harlowe Jr, and G. C. Lawrason. 7 Jun 66, 67p NASA-CR-75951
Contract NAS7-100
Prepared For Jpl

Descriptors: *Battery, *Material testing, *Plastic film, *Polyethylene, *Separator, Acid, Acrylic, Benzene, Cross, Fabrication, Film, Grafting, Irradiation, Linking, Material, Plastic, Testing, Vinyl.

For abstract, see S 04 16.

N66-29566 **Field 13H**
CFSTI Prices HC$3.00 MF$0.75
Republic Aviation Corp., Farmingdale, N. Y. Manufacturing Research Dept.
MAGNETIC FORMING COIL DESIGN AND DEVELOPMENT FINAL SUMMARY REPORT, 17 JUN. 1963 - 31 MAR. 1964.
by N. Inman, G. Pfanner, and F. Smith. Mar 64, 67p NASA-CR-75978, RAC-2214
Contract NAS8-5435
Its Rept.-63-69-1

Descriptors: *Coil, *Distortion, *Magnetic forming, *Welded structure, Aluminum, Component, Correction, Deformation, Forming, Magnetic, Panel, Stiffness, Structure, Welding.

For abstract, see S 04 16.

N66-29710 **Field 13H**
CFSTI Prices HC$2.00 MF$0.50
Lockheed-georgia Co., Marietta.
FABRICATION AND TESTING OF BATTERY SEPARATOR MATERIAL FOR THE JET PROPULSION LABORATORY.
Apr 66, 36p NASA-CR-75980, ER-8487
Contracts NAS7-100, JPL-CA-384807
Prepared For Jpl

Descriptors: *Battery, *Plastic film, *Polyethylene, *Polymerization, *Separator, *Vinyl polymer, Benzene, Carboxylate, Coating, Cross linking, Fabrication, Film, Irradiation, Material, Methylene, Plastic, Sterilization, Test, Vinyl.

For abstract, see S 04 16.

N66-29910 **Field 13H**
CFSTI Prices HC$4.00 MF$0.75
Boeing Co., Seattle, Wash. Nuclear Metals, Inc., West Concord, Mass. Aerospace Group.
IDENTIFYING OPTIMUM PARAMETERS OF HOT EXTRUSIONS INTERIM REPORT NO. II.
by J. G. Hunt, and R. W. Rice. 3 May 66, 105p NASA-CR-76057
Contract NAS7-276
Prepared Jointly With Nucl. Metals, Inc.

Descriptors: *Extrusion, *Magnesium oxide, *Metallurgy, Annealing, Boundary, Ceramic, Crack, Elongation, Grain, Magnesium, Oxide, Residual, Shear, Stress.

For abstract, see S 04 16.

N66-29969 **Field 13H**
CFSTI Prices HC$4.00 MF$1.00
Air Reduction Co., Inc., Murray Hill, N. J. Research And Engineering Dept.
TOFLOX SYNTHESIZER STUDY FINAL REPORT, MAY 27, 1965 - JAN. 31, 1966.
by J. J. Sima. 13 May 66, 126p NASA-CR-76071, RE-66-085-CRE-36
Contract NAS8-20099

Descriptors: *Handbook, *Liquid oxygen (lox), *Maintenance, *Oxygen fluoride, Data, Difluoride, Equipment, Fluoride, Hydrogen, Hypergolic, Ignition, Inventory, Liquid, Lox, Oxygen, Part, Production, Trioxide.

For abstract, see S 04 16.

N66-35566 **Field 13H**
CFSTI Prices HC$4.25 MF$1.75
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ALUMINUM WELD DEVELOPMENT COMPLEX CONFERENCE.
19 Jan 66, 326p NASA-TM-X-57215
Meeting Held 19 Jan. 1966

Descriptors: *Aluminum, *Conference, *Metallurgy, *Quality control, *Welding, Aerospace, Beam, Brazing, Contaminant, Control, Defect, Electron, Gas, Induction, Inert, Metal, Porosity, Quality, Temperature, Time.

For abstract, see S 04 21.

N66-35697 **Field 13H**
CFSTI Prices HC$1.00 MF$0.50
Osterreichische Studiengesellschaft Fur Atomenergie G.m.b.h., Seibersdorf (Austria). Institut Fuer Chemie.
MOLECULAR PLATING V - THE INFLUENCE OF SOME EXPERIMENTAL FACTORS ON THE DEPOSITION YIELD.
by H. Bildstein, N. Getoff, E. Proksch, and H. Saukel. May 66, 19p SGAE-CH-34/1966
Submitted For Publication

Descriptors: *Deposition, *Electrode, *Radioactive nuclide, Cathode, Current, Effect, Electric, Molecular, Nuclide, Plating, Radioactivity, Spacing, Temperature, Yield.

For abstract, see S 04 21.

N66-35976 **Field 13H**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.

RESEARCH ACHIEVEMENTS REVIEW SERIES NO. 10.
by E. Stuhlinger. 1965, 40p NASA-TM-X-53466

Descriptors: *Checkout equipment, *Electronic equipment testing, *Nondestructive testing, *Quality control, *Space vehicle checkout program, *Structural reliability, Automatic, Checkout, Circuit, Computer, Control, Electronic, Equipment, Improvement, Instrument, Nondestructive, Program, Quality, Relay, Reliability, Space vehicle, Stage, Structural, Testing, Ultrasonic, Welding.

For abstract, see S 04 21.

N66-36049 **Field 13H**
CFSTI Prices HC$4.00 MF$0.75
Iit Research Inst., Chicago, Ill. Technology Center.
STUDY OF FACTORS AFFECTING CHEMICAL MILLING FINAL REPORT, 1 JUN. 1965 - 1 JUN. 1966.
by H. T. Francis. 30 Jun 66, 102p NASA-CR-77880, IITRI-B6049-12
Contract NAS8-20112

Descriptors: *Age factor, *Aluminum alloy, *Chemical milling, *Cold working, *Hardness, *Quenching, Affect, Aging, Alloy, Aluminum, Characteristics, Chemical, Cold, Etching, Factor, Milling, Nonuniform, Removal, Roughness, Stock, Working.

For abstract, see S 04 21.

N66-36071 **Field 13H**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
PREPARATION OF CONTRACTOR QUALITY PROGRAM PLAN.
by G. A. Lemke. Jan 66, 14p NASA-TM-X-57879, RA-001-007-1

Descriptors: *Contractor, *Quality control, Assurance, Contract, Control, Element, Inspection, Material, Mission, Nasa program, Plan, Program, Quality, Space, System, Test.

For abstract, see S 04 21.

N66-36420 **Field 13H**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
MANUFACTURING RESEARCH AT MSFC RESEARCH ACHIEVEMENTS REVIEW SERIES NO. 8.
1965, 43p NASA-TM-X-53505

Descriptors: *Magnetic field, *Manufacturing, *Ruby laser, *Saturn v launch vehicle, *Welding, Arc, Beam, Chemical, Composite, Drill, Electron, Field, Gas, Laser, Magnetic, Material, Milling, Pink, Ruby, Temperature, Time, Tool.

For abstract, see S 04 21.

AD-464 852 **See Field 9A**

AD-467 531 **See Field 9A**

AD-472 103 **See Field 11F**

AD-639 736 **See Field 9A**

AD-639 841 **See Field 9A**

AD-639 856 **See Field 11B**

AD-639 951 **See Field 7D**

AD-640 053 **See Field 10C**

AD-640 056 **See Field 9A**

AD-640 300 **See Field 5C**

AD-640 370 **See Field 11F**

AD-640 371 **See Field 11F**

AD-640 402 **See Field 11F**

AD-640 436 **See Field 11C**

AD-640 484 **See Field 9A**

PB-173 340 **See Field 11L**

13I. MACHINERY AND TOOLS

AD-453 316 **Field 13I, 11F**
CFSTI Price: HC$1.60
Royal Aircraft Establishment, Farnborough (England).
LOW FRICTION MATERIALS FOR UNLUBRICATED PLAIN BEARINGS IN ULTRA HIGH VACUUM,
by A. B. Osborn. Mar 64, 20p Technical note CPM-69

Descriptors: (*Bearings, Friction), (*Friction, Bearings), Materials, Stainless steel, Iron, Molybdenum, Tungsten compounds, Carbides, Silver, Vacuum apparatus, Low-pressure research, Graphite, Copper, Molybdenum compounds, Sulfides.

Chosen pairs of materials were tested in a bearing assembly comprising a vertical shaft, held by a pair of journal bearings, with its lower, pointed end supported on a flat plate. Tested shafts were of stainless steel, 'Silver steel, pure iron, molybdenum and tungsten carbide. Bearings and plate were of stainless steel, graphite, graphite and molybdenum disulphide, copper, silver, and tungsten carbide. The bearing assemblies were baked under vacuum for some hours at 400 C. and subsequently tested at room temperature in vacua of the order of 10 to the minus 10th power torr. Only the pure iron shaft and pure silver bearings were satisfactory when so tested. The other pairs showed high friction or seizure, after rotating at about 40 r.p.m. for an hour or less. During the early part of each test, the pressure increased, due to the gas liberated from the rubbing surfaces. After test, each shaft was visually examined for damage to the bearing surfaces. Only the iron shaft in silver bearings was almost unmarked. The pivot and plate contacts appeared generally undamaged. (Author)

AD-640 379 **Field 13I, 13G**
CFSTI Prices: HC$6.00 MF$1.25
Foreign Technology Div., Wright-Patterson AFB, Ohio.
AUTOMATED DRIVES AND THEIR ELEMENTS,
by S. V. Kostina. 22 Apr 66, 213p FTD-MT-64-289
TT-66-62453
Avtomatizirovanye Privody i ikh Elementy, edited machine trans. of Aviatsionnyi Institut, Moscow. Trudy (USSR), v146 160p 1962.

Descriptors: (*Drives, Automation), USSR, Control systems, Servomechanisms, Tracking, Gears, Theory, Numerical analysis, Engines+motors.

The collection considers questions of dynamic accuracy and stability in automated drives and power devices. A method is offered for the construction of the relation of the limiting oscillations amplitude of the track shaft to the frequency and method of selection of the power motor of the track drive. A method is given for the calculation of the mechanical characterics of the hydrodrive with throttle adjustment of speed, and an approximate calculation and practical alignment of the track drive with combined control 'by error' and 'controlling action.' The theory and calculation of the two motor tracking system united with the total load through mechanical differential, is discussed, as well as the calculation and analysis of the work of the relay track drive. (Author)

AD-640 452 **Field 13I**
CFSTI Prices: HC$1.00 MF$0.50
Army Engineer Research and Development Labs., Fort Belvoir, Va.
TESTS OF A PORTABLE GASOLINE-ENGINE POWER DRILL FOR BORING HOLES IN TREES FOR EXPLOSIVE CHARGES,
Final rept. for Jul 66,
by James A. Denni. Aug 66, 22p Rept. no. 1867
Task 1M624101D46501

Descriptors: (*Drills, Portable), Military requirements, Internal combustion engines, Drilling, Trees, Tests.

The report covers tests in which the McCulloch MAC 35A drill with ship auger was evaluated for boring holes in live trees for emplacement of internal explosive demolition charges. In 70 test borings in both hardwood and softwood trees, the gasoline-engine-driven machine with an all-purpose drill attachment and a 1 1/2-inch diameter, 15-inch long ship auger was found capable of boring holes at rates of 1 1/2 seconds per inch in softwood trees or 2 seconds per inch in hardwood trees. Easily and simply operated by one man, the 25-pound engine and drill attachment is portable and highly effective for rapid drilling of boreholes in live, sappy trees for the emplacement of explosive charges for tree-felling in jungle clearing operations. (Author)

N66-27083 **Field 13I**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPONENT HARDNESS DIFFERENCES AND THEIR EFFECT ON BEARING FATIGUE.
by W. J. Anderson, R. J. Parker, and E. V. Zaretsky. 1965, 17p NASA-TM-X-52087
Presented At The Lubrication Conf., San Francisco, 11-13 Oct. 1965, Sponsored By Asme And Am. Soc. Of Lubrication Engr.

Descriptors: *Bearing, *Hardness, *Metal fatigue, Capacity, Component, Deformation, Difference, Effect, Failure, Fatigue, Life, Load, Metal, Residual, Steel, Stress, Tester, Wear.

For abstract, see S 04 15.

N66-27932 **Field 13I**
CFSTI Prices HC$2.00 MF$0.50
Mechanical Technology, Inc., Latham, N. Y.
ANALYSIS AND DESIGN DATA FOR THE AXIAL- EXCURSION TRANSDUCER OF SQUEEZE-FILM BEARINGS.
by T. Chiang, and C. H. Pan. 2 Jun 65, 46p NASA-CR-75619, MTI-65TR25
Contract NAS8-11678

Descriptors: *Bearing, *Film, *Transducer, Axial, Ceramic, Configuration, Excursion, Longitude, Metal, Mode, Motion, Optimization, Resonant, Shell, Squeeze.

For abstract, see S 04 15.

N66-28018 **Field 13I**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
A REVIEW OF BALL MOTION IN AN ANGULAR CONTACT BALL BEARING.
by W. J. Anderson, R. J. Parker, and E. V. Zaretsky. 1966, 37p NASA-TM-X-52207
Presented At The Am. Soc. Of Mech. Engr. Spring Lubrication Symp., New Orleans, 6 Jun. 1966

Descriptors: *Ball bearing, *Friction, *Rolling contact, Angle, Ball, Bearing, Contact, Elastic, Groove, Kinematics, Rolling, Slip, Spin.

For abstract, see S 04 15.

N66-28523 **Field 13I**
CFSTI Prices HC$1.00 MF$0.50
Mechanical Technology, Inc., Latham, N. Y.
ON ASYMPTOTIC ANALYSIS OF GASEOUS SQUEEZE-FILM BEARINGS.
by C. H. Pan. 30 Apr 65, 25p NASA-CR-75680, MTI-65TR20
Contract NAS8-11678

Descriptors: *Asymptotic method, *Diffusion coefficient, *Gas lubricant, *Steady state, *Time dependency, Analysis, Asymptote, Bearing, Dependency, Diffusion, Equation, Film, Gas, Integration, Lubricant, Lubrication, Method, Solution, State, Steady, Time.

For abstract, see S 04 16.

N66-29519 **Field 13I**
CFSTI Prices HC$2.00 MF$0.50
Mechanical Technology, Inc., Latham, N. Y.
ANALYSIS OF THE PRESSURE LOSS CHARACTERISTICS OF THE GAS FEEDING REGIONS OF THE NASA AB-5 GYRO GIMBAL BEARING.
by J. H. Vohr. Aug 63, 41p NASA-CR-75867, MTI-63TR35
Contract NAS8-5154

Descriptors: *Flow measurement, *Gas bearing, Bearing, External, Feed, Flow, Gas, Gimbal, Gyro, Loss, Measurement, Pressure, Subsonic, Supersonic.

For abstract, see S 04 16.

PB-173 142 **Field 13I, 11L, 14C**
CFSTI Prices: HC$1.00 MF$0.50
Forest Products Lab., Madison, Wis.
KNEE POSITION RECORDER FOR SAWMILL CARRIAGE HEADBLOCKS.
Research note,
by F. B. Malcolm, and L. H. Reineke. Aug 66, 16p FPL-0139

Descriptors: (*Saws, Recording systems), (*Milling machines, Recording systems), (*Wood, Material forming), Meters, Automatic, Circuits.

A research instrument is described that automatically records the exact amount the knees of sawmill carriage headblocks move in making rapid successive sets during the sawing operation. It was designed for use on the Forest Products Laboratory's conventional sawmill that is used for studies of sawtooth action and saw performance. It is believed to also have application where an automatic and positive record is required of a succession of irregular intermittent indexing actions. The instrument consists of a marking stylus mounted on the side of the sawmill carriage headblock and a battery-powered electric circuit that produces a mark on an electrosensitive tape. The tape is inserted in a holder affixed to the side of the headblock base. Microswitch assemblies activated by stationary cams positioned along the sawmill track serve to control momentary electric impulses that mark the electrosensitive paper. (Author)

Y-1547 **Field 13I, 11I**
CFSTI Prices: HC$1.00 MF$0.50
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
SPECIAL MACHINE TOOL SLIDE BEARING MATERIAL,
by Charles Asmanes. 20 Jul 66, 9p
Contract W-7405-eng-26

Descriptors: (*Machine tools, *Materials).

For abstract, see N 20 19.

AD-639 654 **See Field 13H**

AD-640 230 **See Field 13H**

AD-640 285 **See Field 13H**

AD-640 420 **See Field 11H**

AD-640 430 **See Field 9C**

13J. MARINE ENGINEERING

AD-639 632 **Field 13J**
CFSTI Prices: HC$1.10 MF$0.50
Naval Medical Research Lab., New London, Conn.
A PHOTOMETRIC SURVEY OF THE RED LIGHTING INSTALLATION ON THE USS TRIGGER (SS-564).
Memorandum rept.
10 Mar 52, 7p MR-52-4
NAVMED-NM-002-041.01

Descriptors: (*Submarines, Illumination), Lighting equipment, Standards, Colors.

Identifiers: SS 564.

A photometric survey of the low level red illumination in the SS-564 was conducted. The examination was limited since the lighting within part of the internally illuminated equipment was not operable. The testing was principally confined to general compartment illumination in the Officers' Quarters, the Attack Center, and the Crews' Mess Section. Conferences were subsequently held with members of the Electric Boat Company and BuShips lighting sections and pot inspections were made on subsequent days. The decisions are reflected in this report and methods have been devised for correcting some of the conditions.

AD-639 633 **Field 13J**
CFSTI Prices: HC$1.10 MF$0.50
Naval Medical Research Lab., New London, Conn.
SECOND PHOTOMETRIC SURVEY OF THE RED LIGHTING INSTALLATION ON THE USS TRIGGER (SS-564).
Memorandum rept.
10 Mar 52, 7p MR-52-5
NAVMED-NM-002-041.01
See also AD-639 632.

Descriptors: (*Submarines, Illumination), Lighting equipment, Standards, Colors.

Identifiers: SS 564.

AD-639 636 **Field 13J**
CFSTI Prices: HC$1.10 MF$0.50
Naval Medical Research Lab., New London, Conn.
REPORT OF TWO PHOTOMETRIC SURVEYS OF RED LIGHTING ON THE SUBMARINE SSK1.
Memorandum rept.
6 Dec 52, 10p MR-52-13
NAVMED-NM-002-014.01

Descriptors: (*Submarines, Illumination), Standards, Lighting equipment, Colors.

Identifiers: SS K1.

A photometric survey of the low level illumination in the SS K1 was conducted. While the readings were accurate to within at least 10% of the stated value, they are of only relative significance since a very large but unknown component was made up of stray white light. In most cases this stray light could not be shielded during the course of taking readings. In view of these irregularities, completed data are not given in this report and only summary comments are made on each compartment.

AD-639 700 **Field 13J**
CFSTI Prices: HC$3.00 MF$0.75
David Taylor Model Basin, Washington, D. C. Hydromechanics Lab.
A DIGITAL COMPUTER TECHNIQUE FOR PREDICTION OF STANDARD MANEUVERS OF SURFACE SHIPS.
Research and Development rept.,
by J. Strom-Tejsen. Dec 65, 86p
DTMB-2130

Descriptors: (*Ships, Maneuverability), (*Maneuverability, Mathematical prediction), Programming (Computers), Mathematical models, Digital computers, Motion, Steering.

The report presents a computer program for the solution of a mathematical model representing the motion of a surface ship, giving predictions of steering and maneuvering qualities. The nonlinear mathematical model based on a third-order Taylor expansion of forces and moments in the equations of motion is reviewed. The hydrodynamic derivatives representing the input to the program can be obtained from present captive model testing techniques. Any motion of a surface ship including tight maneuvers and loop phenomenon recognized in the spiral maneuver for a directional unstable ship should be predictable with accuracy. The computer program which gives predictions for the 'Standard Maneuvers,' turning circles, zig-zag, and spiral maneuver, is described, and results of sample calculations are included. An instruction for preparation of input data for the program, samples of the computer results, and the FORTRAN listing of the computer program are also given. (Author)

AD-640 015 **Field 13J, 1C**
CFSTI Prices: HC$2.00 MF$0.50
David Taylor Model Basin, Washington, D. C. Aerodynamics Lab.
SOME DESIGN PRINCIPLES OF GROUND EFFECT MACHINES, SECTION G - SEAKEEPING,
by Harvey R. Chaplin, and Allen G. Ford. Jul 66, 34p Aero-1100G
Proj. SF-013-0113
Task 11274
DTMB-2121G

Descriptors: (*Ground effect machines, Design), Performance (Engineering), Ocean waves.

Identifiers: Surface effect ships, Seakeeping.

The analytical and experimental tools available for application to GEM seakeeping problems are reviewed briefly. The one available set of seakeeping data for a full-scale GEM is reviewed, and is found to constitute encouraging evidence that GEM seakeeping problems will be tractable. (Author)

AD-640 160 **Field 13J**
CFSTI Prices: HC$1.00 MF$0.50
Naval Submarine Medical Center, Groton, Conn. Medical Research Lab.
LIGHTNING SURVEY OF U.S.S. SABLEFISH (SS303).
Memorandum rept.,
by Jo Ann S. Kinney, and Mary M. Connors. 8 May 63, 5p MR-63-7
NAVMED-MR005.14.1100.1.12

Descriptors: (*Submarines, Illumination), Lighting equipment, Standards.

Identifiers: SS 303.

AD-640 168 **Field 13J**
CFSTI Prices: HC$1.00 MF$0.50
Naval Submarine Medical Center, Groton, Conn.
LIGHTING SURVEY OF U.S.S. SEA OWL (SS-405).
Memorandum rept.,
by Mary M. Connors, and Seymour Weissman.
21 Aug 64, 10p MR-64-4
NAVMED-MR005.14-1100-1.16

Descriptors: (*Submarines, Illumination), Lighting equipment, Standards.

Identifiers: SS 405.

AD-640 187 **Field 13J, 20D**
CFSTI Prices: HC$2.00 MF$0.50
Hydronautics, Inc., Laurel, Md.
MEASUREMENT OF CAVITY SHAPES ABOVE VENTILATED HYDROFOILS.
Technical rept.,
by R. J. Altmann. Nov 65, 44p TR-457-1
Contract Nonr-4276 (00)
Proj. SR-009-01-01
Task 103

Descriptors: (*Hydrofoils, *Cavitation), Measurement, Geometric forms, Angle of attack, Fluid flow.

Identifiers: Supercavitating hydrofoils.

Recent test programs indicate that theoretical streamlines above a supercavitating hydrofoil may be considerably higher than those actually generated. To check theoretical predictions a three-dimensional traversing probe was constructed and used to map the upper cavity surfaces generated by two different two-dimensional hydrofoils. Experimental contours were found to fall below those predicted by theory at all angles of attack and depths of submergence tested. The rate of change of cavity ordinates with changes in angle of attack or depth of submergence is about the same as that predicted by theory. The contribution of angle of attack to cavity shape is responsible for the greater part of the difference between theoretical and measured cavity shapes. (Author)

AD-640 236 **Field 13J**
CFSTI Prices: HC$1.00 MF$0.50
Naval Submarine Medical Center, Groton, Conn. Medical Research Lab.
LIGHTING SURVEY OF U.S.S. HARDHEAD (SS365).
Memorandum rept.,
by Mary M. Connors. 1 Nov 63, 8p MR-63-12
NAVMED-MR005.14-1100-1.15

Descriptors: (*Submarines, Illumination), Standards, Lighting equipment.

Identifiers: SS 365.

AD-640 263 **Field 13J**
CFSTI Prices: HC$1.00 MF$0.50
Naval Medical Research Lab., New London, Conn.
LIGHTING SURVEY OF U. S. S. SEA ROBIN (SS407).
Memorandum rept.,
by Mary A. Connors, and Kevin Laxar. 17 Jun 63, 8p MR-63-9
NAVMED-MR005.14-1100-1.13

Descriptors: (*Submarines, Illumination), Lighting equipment, Standards.

Identifiers: SS 407.

AD-640 312 **Field 13J, 13K, 14D**
CFSTI Prices: HC$5.00 MF$1.00
Navy Marine Engineering Lab., Annapolis, Md.
MAIN SEA-WATER SYSTEM COMPUTER STUDY-PIPING FLEXIBILITY ANALYSES.
Technical memo.,
by David V. Sommer. Sep 66, 157p TM-321/66

Descriptors: (*Pipes, *Submarines), Structural properties, Nuclear powered vessels, Sea water, Reliability, Programming (Computers), Stresses, Mathematical analysis, Mechanical properties.

The computer programs described here are part of the Navy's Main Sea-Water System Study. The programs perform piping flexibility analyses, including calculations of flexibility matrices, displacement and force matrices, and stresses within the piping system. A unique feature of these programs is the fact that they can be solved on a small (IBM 1401) computer. (Author)

AD-640 432 **Field 13J**
CFSTI Prices: HC$3.00 MF$0.75
David Taylor Model Basin, Washington, D. C. Hydromechanics Lab.
PITCH REDUCTION OF SHIPS BY MEANS OF ACTUATED FLAPS OPERATING IN THE WAKE OF A DUCTED PROPELLER.
Final rept.,
by Alvin Gersten. Aug 66, 71p
Proj. S-F013-02-04
Task 1712
DTMB-2183

Descriptors: (*Destroyer escorts, Pitch (Motion)), Propellers (Marine), Wake, Flaps, Reduction, Actuators, Ducts, Ships, Lift, Oscillation, Feasibility studies.

Identifiers: AGDE 1.

The feasibility of reducing the pitching motions of a ship by actuating flaps mounted in the wake of a ducted propeller was investigated by means of model tests. The results of the study are presented and the pitch reduction attainable in State 5 and 6 seas is discussed. It is indicated that with a flap system of acceptable size installed, the pitch reduction achieved does not justify the added design complexities. Evaluations are made of the effect of the flaps on heave, of the force required to drive the flaps, and of the lift produced. Data obtained from sinusoidal excitation of the model (either by waves or flap oscillation) are presented in graphs, and records containing random signals (from irregular wave tests) were analyzed statistically and the results presented in tabular form. (Author)

AD-640 433 **Field 13J**
CFSTI Prices: HC$3.00 MF$0.50
David Taylor Model Basin, Washington, D. C. Hydromechanics Lab.
AN EXPERIMENTAL EVALUATION OF THREE METHODS FOR INCREASING THE LEADING EDGE THICKNESS OF SUPERCAVITATING PROPELLERS.
Final rept.,
by Richard A. Cumming. Aug 66, 55p
Proj. SS-600-000
Task 1722
DTMB-2197

Descriptors: (*Propellers (Marine), Design), (*Leading edge, Thickness), Cavitation, Angle of attack, Performance (Engineering), Model tests.

Identifiers: Supercavitating propellers.

An experimental investigation of three methods of increasing the leading-edge thickness of supercavitating propeller sections was conducted. The purpose of the investigation was to determine which method could be used that would result in the least impairment of the hydrodynamic performance for a given increase of the leading-edge thickness. The three methods were: (1) arbitrary thickening of the section beyond the bounds of the theoretical cavity; (2) use of a greater angle of attack to increase the thickness of the theoretical cavity and, hence, the allowable section thickness; and (3) addition of a parabolic thickness to both the face and back of the section. Five supercavitating propeller models incorporating these three methods of increasing the section thickness were tested in a water tunnel, for a range of various cavitation numbers and advance coefficients. The results indicate that parabolic thickening of the cavity is superior to the arbitrary thickening of the section beyond the theoretical cavity boundary. Use of an increased angle of attack leads to a greater loss of performance than do the other two methods, but it has excellent resistance to face cavitation and, therefore, is recommended where resistance to face cavitation is of great importance. (Author)

AD-640 434 **Field 13J**
CFSTI Prices: HC$2.00 MF$0.50
David Taylor Model Basin, Washington, D. C. Structural Mechanics Lab.
RELATION BETWEEN TESTING AND PERFORMANCE OF STRUCTURES FOR DEEP SEA VEHICLES.
Research and development rept.,
by Ralph B. Allnutt. Aug 66, 43p
DTMB-2256
Presented at the Annual meeting of the American Society for Testing and Materials (69th), held at Atlantic City, New Jersey 27 June-1 July 1966.

Descriptors: (*Vehicles, Deep submergence), Structures, Model tests, Performance (Engineering), Hulls (Marine), Diving, Submarine hulls.

There is increased military, commercial, and scientific interest in the use of deeper diving vehicles to explore, exploit, and transport at deep ocean depths. Stronger and more weight-efficient materials and structures are required for the pressure hulls of these vehicles. The report discusses the balance between design-materials-fabricability and experimental verification. The various types of scaled model tests used to provide the required experimental verification are described. Model test results are compared with analytical predictions and full-scale prototype behavior. Submarine hull concepts and materials that may be necessary in the not too distant future are described. New concepts of simple specimen design and testing which may be required prior to utilization in model tests are also discussed. (Author)

AD-640 448 **Field 13J, 5E**
CFSTI Prices: HC$2.00 MF$0.50
Human Engineering Labs., Aberdeen Proving Ground, Md.
HUMAN FACTORS ENGINEERING EVALUATION OF USNS CORPUS CHRISTI BAY.
Technical note,
by Robert F. Chaillet, and Shirley L. Klett. 1 Sep 66, 30p TN-9-66

Descriptors: (*Floating docks, Maintenance), (*Maintenance equipment, Human engineering), Bays.

Identifiers: Flattop project, Corpus Christi Bay.

The report addresses the areas of human factors engineering attendant to a floating depot maintenance facility. Results and recommendations of the four-month analytic study and on-site survey of the USNS Corpus Christi Bay are discussed. (Author)

AD-640 458 **Field 13J**
CFSTI Prices: HC$1.00 MF$0.50
Webb Inst. of Naval Architecture, Glen Cove, N. Y.
LECTURE NOTES ON NONLINEAR THEORY OF SHIP ROLL MOTION IN A RANDOM SEAWAY.
Final rept.,
by Paul Kaplan. Jul 66, 17p
Grant Nonr (G)-00050-65
Proj. NR-062-305

Descriptors: (*Ships, Roll), Motion, Theory, Nonlinear systems, Damping, Seas.

The problem of nonlinear ship rolling is investigated by means of the method of equivalent linearization. For the case of rolling motion that is nonlinear in regard to damping (i.e. velocity square), it is shown that the spectrum of rolling in irregular beam seas at zero ship speed can readily be determined. A numerical example is given to illustrate the difference between the linear and nonlinear results. (Author)

PB-170 803 **Field 13J, 20K**
CFSTI Prices: HC$2.60 MF$0.50
David Taylor Model Basin, Washington, D. C.
TEMPERATURE-INDUCED STRESSES IN BEAMS AND SHIPS,
by Norman H. Jasper. Jun 55, 27p Rept. no. 937
AD-76 239

Descriptors: (*Beams (Structural), Thermal stresses), (*Tankers, Thermal stresses), Ship hulls, Fracture (Mechanics), Ship plates.

A theoretical method is given for computing temperature-induced stresses in a nonhomogeneous or homogeneous beam or girder of uniform cross section for any temperature distribution over the cross section. It is assumed that all cross sections have the same temperature distribution. The method is illustrated by application to a simplified model of a ship constructed of steel and aluminum and to a T-2 tanker design. (Author)

AD-476 684 **See Field 11F**

AD-639 912 **See Field 20K**

AD-639 953 **See Field 13E**

AD-640 054 **See Field 11I**

AD-640 070 **See Field 21E**

AD-640 469 **See Field 5E**

PB-173 348 **See Field 21F**

13K. PUMPS, FILTERS, PIPES, FITTINGS, TUBING, AND VALVES

AD-639 728 **Field 13K, 11H**
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
ON THE USE OF DIFFUSION PUMP OIL IN MECHANICAL PUMPS,
by T. W. Haas, and Allen G. Jackson. 8 Nov 65, 3p ARL-66-0165
Proj. 7023
Availability: Published in Journal of Vacuum Science and Technology v3 n3 p169 1965.

Descriptors: (*Vacuum pumps, *Oils), Diffusion pumps, Vacuum apparatus, Performance (Engineering), Pumps.

AD-640 026 **Field 13K, 13A, 13M**
CFSTI Prices: HC$3.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
BRECKENRIDGE BLAST-ACTUATED CLOSURE VALVE.
Final rept., Jul 61-May 66,
by R. A. Breckenridge. Sep 66, 53p R-481
Proj. Y-F011-05-02-302

Descriptors: (*Shelters, Ventilation), (*Valves, Cooling + ventilating equipment), (*Safety valves, Blast), Shock waves, Check valves, Design.

The ventilation systems of shelters providing blast protection must have automatic valves to prevent ingress of damaging pressure waves through the air ducts. This report discusses a blast-actuated closure valve developed, tested, and evaluated at the U. S. Naval Civil Engineering Laboratory. For ventilation the valve has a rated airflow of 700 cfm. It provides protection from blast overpressures up to 150 psi. It also provides protection during the negative phase following any blast wave. When installed as intended, the valve should be relatively insensitive to the thermal pulse and ground accelerations associated with nuclear explosions. It is also insensitive to environmental conditions. Its operation is simple and reliable, and resetting is unnecessary because of the valve's automatic response. It requires no maintenance. (Author)

N66-35655 **Field 13K**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
BLADE ELEMENT PERFORMANCE OF AXIAL-FLOW PUMP ROTOR WITH BLADE TIP DIFFUSION FACTOR OF 0.66.
by M. J. Miller, and D. M. Sandercock. 1966, 35p NASA-TN-D-3602

Descriptors: *Axial pump, *Flow measurement, *Radial distribution, *Rotor blade, Axial, Blade, Cascade, Cavitation, Diffusion, Distribution, Element, Factor, Flow, Measurement, Performance, Pump, Radial, Rotor, Water.

For abstract, see S 04 21.

N66-35792 **Field 13K**
CFSTI Prices HC$3.00 MF$0.75
Chrysler Corp., New Orleans, La. Space Div.
QUALIFICATION TEST OF SATURN S- I B STAGE LOX REPLENISHING VALVE (60 C20457).
by R. M. Dale. 9 Jun 65, 80p NASA-CR-77656, TR-RE-65-54
Contract NAS8-4016

Descriptors: *Control valve, *Function test, *Liquid oxygen (lox), *Saturn s- ib stage, *Vibration testing, Ball, Control, Dielectric, Function, Humidity, Impact, Life, Liquid, Lox, Oxygen, Pressure, Qualification, Replenishment, Test, Valve, Vibration.

For abstract, see S 04 21.

N66-36386 **Field 13K**
CFSTI Prices HC$5.00 MF$1.25
Iit Research Inst., Chicago, Ill.
BACKSTREAMING FROM OIL DIFFUSION PUMPS FINAL REPORT, DEC. 1, 1963 - MAY 30, 1966.
by V. R. Ivanuski, and W. M. Langdon. 1 Jul 66, 184p NASA-CR-77934, IITRI-C6030-10
Contract NASR-65/08/

Descriptors: *Contamination, *Molecular pump, *Oil, Backstreaming, Baffle, Diffusion, Molecular, Pump, Turbine, Ultrahigh, Vacuum.

For abstract, see S 04 21.

AD-640 312 **See Field 13J**

13L. SAFETY ENGINEERING

AD-639 913 **Field 13L**
CFSTI Prices: HC$2.00 MF$0.50
Federal Fire Council, Washington, D. C.
THE FUTURE OF THE MUNICIPAL FIRE SERVICE. INDUSTRIAL FIRE SAFETY TODAY.
12 Apr 66, 42p
Presented at the Federal Fire Council Annual Meeting Washington, D. C., 12 Apr 66.

Descriptors: (*Fire safety, Symposia), Urban areas, Industries.

Topics presented at the Federal Fire Council annual meeting: 'The Future of the Municipal Fire Service' and 'Industrial Fire Safety Today'.

AD-639 914 **Field 13L**
CFSTI Prices: HC$1.00 MF$0.50
Federal Fire Control, Washington, D. C.
FEDERAL FIRE EXPERIENCE FOR FISCAL YEAR 1965.
Sep 66, 11p

Descriptors: (*Fire safety, United States Government), Statistical data.

AD-639 915 **Field 13L**
CFSTI Prices: HC$1.00 MF$0.50
Federal Fire Council, Washington, D. C.
FIRE SAFETY IN, ON AND AROUND CONSTRUCTION PROJECTS, INCLUDING THE TAKE-OVER PERIOD,
by Edgar H. Bolles. 4 May 65, 10p
Presented at the National Capital Chapter of the American Society of Safety Engineers, 4 May 65.

Descriptors: (*Fire safety, Buildings), Construction.

AD-639 916 **Field 13L**
CFSTI Prices: HC$1.00 MF$0.50
Federal Fire Council, Washington, D. C.
FIRE SAFETY INFORMATION.
17 Jun 66, 16p

Descriptors: (*Fire safety, United States Government), Reports, Statistical data.

Contents: Mission Safety 70 and fire protection and protective service.

AD-639 917 **Field 13L**
CFSTI Prices: HC$1.00 MF$0.50
Federal Fire Council, Washington, D. C.
THE SYSTEMS APPROACH TO FIRE PROTECTION.
1 Aug 66, 16p

Descriptors: (*Fire safety, Systems engineering), Reports.

Contents: The systems approach to fire protection. Systems approach to evaluating public fire fighting operations. The systems approach to fire protection codes.

AD-640 025 **Field 13L**
CFSTI Prices: HC$4.00 MF$1.00
Ammann and Whitney, New York.
ESTABLISHMENT OF SAFETY DESIGN CRITERIA FOR USE IN ENGINEERING OF EXPLOSIVE FACILITIES AND OPERATIONS.
Technical rept.,
by Arthur Schwartz, Edward Cohen, and Norval Dobbs. Jul 66, 146p Rept. no. 6
Contract DA-28-017-AMC-423 (A)
PA-TR-3439
Report on Test of 1/10 Scale Bay Structure.

Descriptors: (*Shielding, Explosions), (*Reinforced concrete, Shielding), (*Safety, Explosive materials), Test facilities, Design, Storage, Processing, Model tests, Structures.

Three tests of 1/10 scale specially reinforced concrete test bay were performed to evaluate the explosive capacity of a specific cubicle arrangement and as a first step in establishing the validity of scaled testing of concrete structures. The tests consisted of firing 2.00, 3.24 and 4.25-lb. charges of Composition B in the center of the test bay and evaluating the extent of damage to the bay to estimate its ultimate explosive capacity. (Author)

AD-640 374 **Field 13L, 16A, 1E, 13F**
CFSTI Prices: HC$2.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
PROTECTIVE STRUCTURES AND COMPONENTS: COMPILATION OF ABSTRACTS.
Rept. no. 1 on ATD work assignment no. 13,
by Paul R. Nyberg, and John Paasche. 29 Jul 66, 48p ATD-66-90
TT-66-62455
Based on CHICOM and Western open sources pub. 1964-1966. Rept. on Surveys of Chinese Communist Scientific and Technical Literature.

Descriptors: (*Structures, Abstracts), Launching sites, Guided missile launchers.

Airports, Railroads, Transportation, Ships, China, Bibliographies.

Abstracts are provided on missile or space vehicles, transportation, and launch site.

N66-29324 **Field 13L**
CFSTI Prices HC$2.00 MF$0.50
Royal Air Force, Farnborough (England). Inst. Of Aviation Medicine.
AN ASSESSMENT OF THE FIRE RISKS OF THE ENT EXPERIMENTS.
by D. M. Denison. Jan 65, 31p FPRC/MEMO-217
31 P Refs

Descriptors: *Decompression, *Fire control, *Pressure chamber, *Safety hazard, Chamber, Control, Electric, Fire, Hazard, Ignition, Loop, Oxygen, Pressure, Safety, Vacuum.

For abstract, see S 04 16.

PB-172 871 **Field 13L**
CFSTI Prices: HC$1.00 MF$0.50
Forest Products Lab., Madison, Wis.
LIST OF PUBLICATIONS ON FIRE PERFORMANCE.
Jun 66, 5p

Descriptors: (*Fires, Bibliographies), Test methods, Fire resistant materials, Flammability, Wood, Structures, Fire safety.

The list includes publications that give general information and the results of research on fire test methods, fire retarding chemicals and treatments, and fire behavior of treated and untreated wood, wood products, and wood structures.

PB-173 089 **Field 13L, 13M**
CFSTI Prices: HC$1.00 MF$0.50
Federal Fire Council, Washington, D. C.
FIRE SAFETY IN, ON AND AROUND CONSTRUCTION PROJECTS, INCLUDING THE TAKE-OVER PERIOD,
by Edgar H. Bolles. 4 May 65, 10p
Prepared for presentation at National Capital Chapter of American Society of Safety Engineers, 4 May 65.

Descriptors: (*Fire safety, *Construction), Buildings, Hazards, Electrical equipment, Flammability, Combustion, Accidents, Symposia.

PB-173 328 **Field 13L, 13B, 13F**
CFSTI Prices: HC$3.00 MF$0.50
Cornell Aeronautical Lab., Buffalo, N. Y.
A STUDY OF TIRE-SURFACE INTERACTION FOR THE CASE OF ROLLING ON A WET SURFACE.
Interim rept.,
by Desmond F. Moore. Jan 65, 57p CAL-YD-1969-V-1, 0625
Contract CPR-11-1058

Descriptors: (*Tires, Surfaces), (*Skidding, Tires), (*Roads, Surface properties), Roughness, Test methods, Test equipment, Meters, Drainage, Moisture.

The report summarizes the work accomplished to date on the tire-surface interaction study performed under the sponsorship of the Bureau of Public Roads. Present equipment includes an outflow meter, a dynamic draping apparatus, an instrument for recording the profile of surfaces and a British portable skid-resistance tester. The regularly rough surfaces used were of the cubed asperity and square-pyramid type, whereas the random surfaces used so far in this investigation consisted of waterproof sandpapers of different grain size and a concrete block. The outflow meter (an instrument designed specifically to assess drainage ability of rough surfaces) was calibrated and checked on the regularly rough surfaces. Predictions of the size of texture were then obtained in the case of the sandpaper surfaces by using the outflow meter, and these predictions were confirmed by examining the profiles of the same surfaces. The mean hydraulic radius is shown to be a valid drainage number for all surfaces, and drainage numbers are given for the surfaces tested. (Author)

AD-640 216 **See Field 4B**

ORNL-3901 **See Field 18I**

PB-173 312 **See Field 13F**

PB-173 313 **See Field 13F**

PNE-717F **See Field 18H**

13M. STRUCTURAL ENGINEERING

AD-639 653 **Field 13M**
CFSTI Prices: HC$1.00 MF$0.50
Brooks and Perkins, Inc., Detroit, Mich.
DEVELOPMENT OF A LIGHTWEIGHT 50 FOOT MAST. MAST AB-864 ()/G.
Quarterly rept. no. 4, 24 Mar-30 Jun 66,
by Edward C. Nagy. Sep 66, 16p Rept. no. 320
Contract DA-28-043-AMC-01416 (E)
Proj. DA-1E6-34301-D-244
Task 1E6-34301-D-244-06
ECOM-01416-4
See also AD-638 819.

Descriptors: (*Antenna masts, Portable), Weight, Aluminum alloys, Pipes, Installation, Wire, Mechanical drawings.

The mast, being developed to meet the requirements of specification SCL-4296B, is basically a revised and improved version of the earlier Mast AB-864 ( )/G developed to meet specification SCL-4296A. The primary objectives of this program are; (1) to reduce the mast weigh and overall size, (2) to decrease the erection and repackaging time and (3) assure greater personnel safety. Manufacturing drawings have been prepared on major assemblies and components. Fabrication of the launcher is well underway. Fabrication and testing of the sample mast sections has been accomplished. The final design of the male stud portion has been selected. (Author)

AD-639 711 **Field 13M, 20K**
CFSTI Prices: HC$2.00 MF$0.50
Graduate Aeronautical Labs., Calif. Inst. of Tech., Pasadena.
INFLUENCE OF AN AXIAL SUPERSONIC FLOW ON THE BUCKLING OF THIN CYLINDERS UNDER END COMPRESSION,
by Y. C. Fung. Jul 66, 36p
Contract AF 49 (638)-1364
Proj. AF-9782
Task 978201
AFOSR-66-1668

Descriptors: (*Structural shells, *Buckling (Mechanics)), (*Cylindrical bodies, Supersonic flow), Loading (Mechanics), Force (Mechanics), Structural properties, Partial differential equations, Boundary value problems.

The combined features of two classical problems of shell instability are discussed, namely, the buckling of a circular cylindrical shell under axial compression, and the panel flutter of such a shell in an axial supersonic flow. In this paper, the static buckling of a shell in a supersonic stream, mathematically described by Donnell's equations and by linear piston theory, is solved. A special assumption with regard to the aerodynamic drag force (or skin friction) is made to simplify the analysis. Closed form solutions are found and are applied to semi-infinite cylinders. Results are obtained for two types of simply-supported edges and two types of clamped edges. The influence of a supersonic flow on lowering the critical buckling load of a circular cylindrical shell under axial compression is shown. The remarkable difference between the aerodynamic effect of a leading edge and a trailing edge is demonstrated. In all the cases examined the leading edge is less stable than the trailing edge. (Author)

AD-639 769 **Field 13M, 20K**
Not available from CFSTI.
Graduate Aeronautical Labs., Calif. Inst. of Tech., Pasadena.
SOME EXPERIMENTAL OBSERVATIONS ON THE NONLINEAR VIBRATION OF CYLINDRICAL SHELLS.
Revised ed.,
by Mervyn D. Olson. 11 Jun 65, 3p GALCIT, Pub-615
Revision of manuscript submitted 15 Apr 65.
Availability: Published in AIAA Journal v3 n9 p1775-7 Sep 1965.

Descriptors: (*Structural shells, Vibration), Cylindrical bodies, Thickness, Experimental data.

The experimental results presented support the thesis that the nonlinear vibrations of thin cylindrical shells in mode shapes with long axial wavelengths exhibit many of the phenomena previously observed for thin circular rings. In particular, for amplitudes of the order of the shell thickness, the vibrations exhibit a slight nonlinearity of the 'softening' type. (Author)

AD-639 989 **Field 13M**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
PREPARATION OF A PRE-ASSEMBLED THOROUGHFARE ON A CONSTRUCTION PLATFORM,
by L. F. Korzun, and N. F. Ustinov. 28 May 64, 3p I-3135-B
TT-65-63808
Izgotovlenie Sbornoi Proezzhei Chasti na Stroitelnoi Ploshchadke, trans. of Transportnoe Stroitelstvo (USSR) v13 n2 p15-6 1963.

Descriptors: (*Bridges, *Reinforced concrete), USSR, Construction, Molding, Structural parts, Railroads, Steel.

AD-640 232 **Field 13M**
CFSTI Prices: HC$3.00 MF$0.75
Naval Civil Engineering Lab., Port Hueneme, Calif.
LIGHT-DUTY, EXPANDABLE LAND ANCHOR (30,000-POUND CLASS).
Final rept. Jun 64-Dec 65,
by Paul A. Dantz. Aug 66, 59p TR-R-472
Proj. Y-F015-15-01-011

Descriptors: (*Anchors (Structural), Expandable structures), Soils, Installation, Design, Drilling, Tests, Performance (Engineering).

The study developed a family of two-fluke, light-duty, expandable land anchors that have ultimate vertical holding strengths of 30,000 to 60,000 pounds in sand and clay soils. It also includes a method of installation for these anchors that reduces excavation of the boring of either a 3- or 6-inch-diameter hole. The anchors when closed form a nominal 3- or 6-inch circular cylinder. After installation, two flukes are opened by the soil action to hold the anchor in the soil. One hundred and fifty-six field tests were conducted to evaluate the anchor design, vertical and horizontal holding strength, structural strength, opening characteristics, fluke length, overburden depth, and installation equipment and techniques. Recommendations on the use of these expandable anchors are included. (Author)

N66-28220 **Field 13M**
CFSTI Prices HC$2.00 MF$0.50
France. Office National D Etudes Et De Recherches Aerospatiales, Chatillon-sous-bagneux.

METHOD FOR THE DETERMINATION OF THE CONSTANTS OF INERTIA BY A GROUND VIBRATION TEST.
Methode De Determination Des Constantes D'inertie A L'aide D'un Essai De Vibration Au Sol
by R. Kappus. 1966, 27p TN-96
In French, English Summary

Descriptors: *Inertia moment, *Mode shape, *Natural frequency, *Rigid body, Body, Degree, Freedom, Frequency, Generalization, Ground, Inertia, Mass, Method, Mode, Moment, Motion, Natural, Rigid, Shape, Test, Vibration.

For abstract, see S 04 15.

PB-173 134 **Field 13M, 9C, 8M**
CFSTI Prices: HC$3.00 MF$0.75
Bureau of Reclamation, Denver, Colo. Soils Engineering Branch.
LOAD TESTS ON GROUTED GUY ANCHORS AND TOWER FOOTINGS, OREGON BORDER-MEAD 750-KV D-C TRANSMISSION LINE PACIFIC NORTHWEST-PACIFIC SOUTHWEST INTERTIE,
by H. J. Gibbs. 12 Apr 66, 54p EM-728

Descriptors: (*Anchors (Structural), Loading (Mechanics)), (*Transmission lines, Anchors (Structural)), Soil mechanics, Foundations (Structural), Tests.

Eight field pullout tests on grouted guy anchors and 3 types of transmission tower footings in alluvial, granular soil indicated that anchors and footings would resist loads equal to or greater than computed design loads. These tests were conducted to help solve foundation design problems for the proposed Oregon Border-Mead 750-kv d-c Transmission Line. Pull loads were applied to 3 guy anchors, 2 BPA steel pressed-plate footings, 1 steel grillage footing, and 2 anchor bar footings consisting of a concrete cap on 4 anchor bars grouted in the soil. For soils similar to those at the test site and considering 0.5 in. as maximum allowable horizontal or vertical movement, the following was concluded: (1) Guy anchors of 11- or 15-ft long No. 11 deformed reinforcing bars grouted in 5-in.-dia vertical or 45-deg angle holes had uplift resistances of 80 kips for vertical anchors and 68 kips for the 45-deg anchor. (2) Anchor-bar footings with 5- and 8-ft long No. 8 anchor bars had uplift resistances of 80 and 72 kips respectively. (3) Steel grillage footing withstood a load of 180 kips. (4) BPA pressed-plate footing successfully withstood the 24-kip design load, but due to bolt and sling failures, lateral capabilities above 24 kips were not determined. (Author)

PB-173 272 **Field 13M, 11B, 13B**
CFSTI Prices: HC$1.00 MF$0.50
Illinois Univ., Urbana. Dept. of Civil Engineering.
STRENGTH OF PRESTRESSED CONCRETE BEAMS WITH WEB REINFORCEMENT,
by J. G. MacGregor, M. A. Sozen, and C. P. Siess. Jan 66, 18p Structural Research ser-46, Rept. no. 0140
Proj. IHR-10
Report of the Investigation of Prestressed Reinforced Concrete for Highway Bridges. Prepared in cooperation with Bureau of Public Roads, Washington, D. C. and Illinois State Div. of Highways. Journal of The American Concrete Institute Proceedings v62 n12 1503-19 Dec 1965.

Descriptors: (*Reinforced concrete, *Beams (Structural)), Stresses, Fracture (Mechanics), Reinforcing materials, Shear stresses, Bending, Loading (Mechanics), Roads, Bridges, Illinois.

The overall objective in the study of the effect of web reinforcement on the strength of prestressed concrete beams subjected to combined bending and shear is to develop a workable method of designing the web reinforcement. The proposed method assumes a beam to carry shear corresponding to the inclined cracking load without aid from stirrups and calls for the addition of stirrups to carry any additional shear present. The results from tests of 104 simply supported beams described in the report provide a basis for evaluating the relative effects of draped strand and stirrups in resisting flexure and shear cracking. Although theoretical analyses have been developed previously to explain the effect of web reinforcement on the shear strength of concrete beams, the utilization of such analyses is so complex that the determination of the capacity of beams with web reinforcement is generally performed empirically. An empirical expression is provided which predicts the strength of beams with web reinforcement as derived from experimental data. Shear failures are prevented by providing web reinforcement in accordance with this expression. Draped reinforcement, either alone or in combination with web reinforcement, was found to decrease the flexure-shear cracking load. (Author)

PB-173 274 **Field 13M, 13B**
CFSTI Prices: HC$2.00 MF$0.50
Fritz Engineering Lab., Lehigh Univ., Bethlehem, Pa.
EXPERIMENTAL INVESTIGATION OF THE BUCKLING OF PLATES WITH RESIDUAL STRESSES,
by Fumio Nishino, Yukio Ueda, and Lambert Tall. Apr 66, 47p Fritz Report-290.3, Rept. no. 505
Report on Welded Built-Up and Rolled Heat-Treated T-1 Steel Columns. Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Metal plates, Buckling (Mechanics)), Stresses, Structural parts, Welds, Steel, Pennsylvania.

The report is a summary of local buckling tests of plate elements in square columns build-up by welding. The experiments were conducted to verify theories for the elastic and elastic-plastic buckling of plates with emphasis on the effect of residual stress. This was part of a general study on the strength of welded columns and the influence of residual stress on plate buckling. Both ASTM A7 and A514 steels were used. The square section simulated plates simply supported at the unloaded edges, and the length of the column was chosen so that end conditions had no effect either on the residual stress distribution or on the local buckling strength of the columns. Short columns were tested in the 'as placed' condition in a mechanical-type testing machine. The transverse deflection (local buckling) of the plates was measured at a number of cross sections by a 1/10,000 inch dial gage fixed to a frame held manually. The 'top of the knee' method was used to estimate the bifurcation load. The experimental results showed good correlation with theoretical predictions including the effect of residual stress for elastic buckling and for elastic-plastic buckling based on the total strain theory. The results of experiments indicated that considerable postbuckling strength may be expected for elastic buckling of plates, although not for elastic-plastic buckling. (Author)

PB-173 276 **Field 13M, 13B**
CFSTI Prices: HC$4.00 MF$0.75
Maryland Univ., College Park. Dept. of Civil Engineering.
DYNAMIC BEHAVIOR OF HIGHWAY BRIDGES. ANALYSIS OF RESULTS OF THE TESTS ON THREE BRIDGES.
Final rept.,
by Robert J. Reilly, and Charles T. G. Looney. Mar 66, 118p Rept. no. 0514
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Bridges, Loading (Mechanics)), Roads, Maryland, Steel, Beams (Structural), Aluminum, Reinforced concrete, Experimental data, Dynamics, Stresses, Structural properties.

Data are summarized and analyses made for identical test programs consisting of controlled heavy vehicle loadings made on a steel girder bridge, a prestressed concrete bridge and an aluminum bridge. Findings are based on strain and deflection readings measured at 48 critical points on each bridge. The test vehicle was driven at speeds from crawl to over 50 mph in prescribed paths with a load approximating that of an H20-S16 design vehicle. The results are compared with theoretical results to show the relationship of actual heavy vehicle loading effects to the assumed values used for design. (Author)

PB-173 282 **Field 13M, 13B**
CFSTI Prices: HC$6.00 MF$1.25
Texas Univ., Austin. Center for Highway Research.
DISCONTINUOUS ORTHOTROPIC PLATES AND PAVEMENT SLABS,
by W. Ronald Hudson, and Hudson Matlock. May 66, 233p Research rept. RR-56-6, Rept. no. 0399
Proj. 3-5-63-56
Prepared in cooperation with Texas Highway Dept. and Bureau of Public Roads, Washington, D. C. Report on Development of Methods for Computer Simulation of Beam-Columns and Slab Systems.

Descriptors: (*Pavements, Mathematical models), Texas, Roads, Elasticity, Loading (Mechanics), Programming (Computers), Theory, Bending, Stresses.

Solutions are presented for the deflected shape of freely discontinuous orthotropic plates and pavement slabs subjected to a variety of loads including transverse loads, in-plane forces and externally applied couples. The method is applicable for plates and pavement slabs with freely variable foundation support including holes in the subgrade. Anisotropic elasticity governs the behavior of orthotropic plates and pavement slabs and is used to develop the necessary equations. The method is not limited by discontinuities and uses an efficient alternating-direction iteration means of solving the resulting equations. The method allows considerable freedom in configuration, loading, flexural stiffness and boundary conditions. It solves the problem rapidly and should provide a tool for use in later studies of repetitive stochastic loading. Three principal features are incorporated into the method: (1) the plate is defined by a finite-element model consisting of bars, springs, elastic blocks and torsion bars. These are further grouped for analysis into orthogonal systems of beam-column elements and forces, (2) each individual line-element of the two dimensional system is solved rapidly and directly by recursive techniques, (3) an alternating-direction iterative method is utilized for coordinating the solution of the individual line-elements into the slab solution. The computer program utilizes the equations and techniques developed and can be used by the reader. Several sample problems illustrate the generality of the method and the use of the computer program. The results compare well with closed-form solutions. (Author)

PB-173 289 **Field 13M**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Reclamation, Denver, Colo. Dams Branch.
STRUCTURAL BEHAVIOR ANALYSIS, CANYON FERRY DAM 1951-1964,
by Keith Jones, and Louis H. Roehm. Aug 66, 25p DD-4

Descriptors: (*Dams, Structural properties), Stresses, Thermal stresses, Strain gages, Reinforced concrete, Meters, Montana.

During the construction of Canyon Ferry Dam, 5 strain meter clusters, 1 'no-stress' strain meter pair, 10 joint meters, 1 crack detector, and 28 resistance thermometers were embedded in the concrete of the maximum vertical section. Periodic readings of the strain meters and intermittent readings of the other meters were continued from May of 1951 through 1964 and the readings reduced

to stresses and joint movements which are significant in the analysis of the structural behavior of the dam. Results show a maximum compressive stress of about 540 psi. Transient tensile stresses of about 50 psi occurred only during early ages of the concrete. (Author)

PB-173 355 **Field 13M, 13B**
CFSTI Prices: HC$6.00 MF$1.25
New Hampshire Univ., Durham.
THE COMPUTER ANALYSIS OF ORTHOTROPIC STEEL PLATE SUPERSTRUCTURES FOR HIGHWAY BRIDGES. VOLUME I. COMPARISON WITH CONVENTIONAL DESIGNS,
by Shan S. Kuo. Oct 65, 231p
Contract CPR-11-9736
See also PB 173 356.

Descriptors: (*Bridges, Structural properties), Design, Roads, Steel, Metal plates, Structural parts, Digital computers, Programming (Computers), Economics, Weight, Stresses, Mechanical properties, Floors.

Four orthotropic plate bridge deck designs were performed with the full utilization of newly developed electronic computer programs together with conventional construction bridge designs for 80 feet span, 171 feet span, 171-234-171 feet spans, and 280-350-280 feet spans. The result of cost comparison for the eight bridge designs shows that for modern short span highway bridges, the introduction of orthotropic plate design of the superstructure can be more economical above 130 feet span length than the conventional bridge design. Additional savings might accrue in favor of the orthotropic bridges by using less expensive substructures, saving by lesser maintenance for steel decks, and standardizing details to fabricating procedures. (Author)

PB-173 356 **Field 13M, 9B**
CFSTI Prices: HC$4.00 MF$1.00
New Hampshire Univ., Durham.
THE COMPUTER ANALYSIS OF ORTHOTROPIC STEEL PLATE SUPERSTRUCTURES FOR HIGHWAY BRIDGES. VOLUME II. PROGRAM DESCRIPTION TYPE I BRIDGE,
by Shan S. Kuo. Oct 65, 132p
Contract CPR-11-9736
See also PB-173 355.

Descriptors: (*Bridges, Structural properties), (*Structural properties, *Programming (Computers)), Roads, Steel, Digital computers, Metal plates, Floors, Design.

The volume describes a complete set of computer programs, together with the input-output format, for structural design of a highway bridge superstructure using orthotropic steel plate decks. This volume is applicable to Type I bridge, an orthotropic plate deck on twin I-shape girder. The deck span consists of closed ribs, floor beams, and plates. The programs are written specifically for IBM 1620 computer system with 60K memory locations. There are seven phases in the volume. They should be executed consecutively. Programs for Phases I through V inclusive are written in FORTRAN II while programs for Phases VI through VII are in SYMBOLIC PROGRAMMING LANGUAGE. The maximum number of lanes of the bridge considered in this volume is six, although little effort is required to increase the number of lanes. It should be noted that the secondary stresses are not considered in Type I bridge as discussed in this volume. (Author)

PB-173 357 **Field 13M, 9B**
CFSTI Prices: HC$6.00 MF$1.25
New Hampshire Univ., Durham.
THE COMPUTER ANALYSIS OF ORTHOTROPIC STEEL PLATE SUPERSTRUCTURES FOR HIGHWAY BRIDGES. VOLUME III. PROGRAM DESCRIPTION TYPE II BRIDGE,
by Shan S. Kuo. Oct 65, 204p
Contract CPR-11-9736
See also PB-173 356.

Descriptors: (*Bridges, Structural properties), (*Structural properties, *Programming (Computers)), Roads, Steel, Digital computers, Metal plates, Floors, Design.

The volume describes a complete set of computer programs, together with the input-output format, for structural design of a highway bridge superstructure using orthotropic steel plate deck. This volume is applicable to Type II bridge, an orthotropic plate deck on twin box girder. The deck span consists of closed ribs, floor beams, and plates. The programs are written specifically for IBM 1620 computer system with 60 k memory locations. There are twelve phases in the volume. They should be executed consecutively. Programs for Phase I through X inclusive are written in Fortran II while programs for Phase XI through XII are in SYMBOLIC PROGRAMMING LANGUAGE. The maximum number of lanes of the bridge considered in this volume is four, although little effort is required to increase the number of lanes. (Author)

PB-173 358 **Field 13M, 9B**
CFSTI Prices: HC$5.00 MF$1.00
New Hampshire Univ., Durham.
THE COMPUTER ANALYSIS OF ORTHOTROPIC STEEL PLATE SUPERSTRUCTURES FOR HIGHWAY BRIDGES. VOLUME IV. PROGRAM DESCRIPTION TYPE I BRIDGE,
by Shan S. Kuo. Oct 65, 154p
Contract CPR-11-9736

Descriptors: (*Bridges, Structural properties), (*Structural properties, *Programming (Computers)), Roads, Steel, Digital computers, Metal plates, Floors, Design.

The volume describes a complete set of computer programs, together with the input-output format, for structural design of a highway bridge superstructure using orthotropic steel plate decks. This volume is applicable to Type III bridge, an orthotropic plate deck on twin box girder. The deck span consists of closed ribs, floor beams and plates. The programs are written specifically for IBM 1620 computer system with 60 k memory locations. There are nine phases in the volume. They should be executed consecutively. Programs for Phase I through VII inclusive are written in FORTRAN II while programs for Phase VIII through Phase IX are in SYMBOLIC PROGRAMMING LANGUAGE. The maximum number of lanes of the bridge considered in this volume is four, although little effort is required to increase the number of lanes. It should be noted that the secondary stresses are not considered in Type III bridge as discussed in this volume. (Author)

PB-173 359 **Field 13M, 8M**
CFSTI Prices: HC$2.00 MF$0.50
Columbia Univ., New York. Dept. of Civil Engineering and Engineering Mechanics.
THE FORCES ON RIGID CULVERTS UNDER HIGH FILLS,
by Colin B. Brown. 1966, 32p
Prepared in cooperation with U. S. Department of Commerce, Bureau of Public Roads.

Descriptors: (*Bridges, Force (Mechanics)), Loading (Mechanics), Elasticity, Soil mechanics.

The forces acting on the barrel of a rigid culvert due to the dead load of a high fill depend upon the construction method, the presence of heterogeneous inclusions of organic material, the material of the earth's crust, the fill properties and fill and culvert geometries. These features are accounted for by the finite-element method for obtaining approximate solutions to linear elasticity problems. The analytical methods are applied to an actual embankment over a rigid culvert the barrel of which was instrumented with pressure meters. The analytical results for two conditions of the earth's crust, various fill properties and for a hay block deliberately placed above the crown of the culvert (as in the actual construction) are compared with the recorded pressures. It is concluded that given a proper description of the material properties, in particular the ratio of fill hay modulus, an accurate distribution of barrel pressure may be obtained. (Author)

PB-173 360 **Field 13M, 20K, 13B**
CFSTI Prices: HC$2.00 MF$0.50
Virginia Council of Highway Investigation and Research, Charlottesville.
STRESSES AND DISPLACEMENTS IN VISCOELASTIC LAYERED SYSTEMS UNDER CIRCULAR LOADED AREAS,
by Y. H. Huang. May 66, 50p
For presentation at the International Conference on the Structural Design of Asphalt Pavements (2d), August 7-11, 1967, Ann Arbor, Michigan.

Descriptors: (*Sandwich construction, Viscoelasticity), Stresses, Deformation, Loading (Mechanics), Numerical methods and procedures, Materials, Theory.

The report is concerned with the analysis of vertical stresses and displacements in viscoelastic layered systems under circular loaded areas. The analysis is based on the elastic-viscoelastic correspondence principle in which the Laplace transform is applied to replace the time variable with a transformed variable and thus change the viscoelastic problem into an associated elastic problem. The solution of the associated elastic problem, when transformed back into the real time variable, gives the desired viscoelastic solution. Two methods were developed to determine numerically the stresses and displacements in two- and four-layer systems made of viscoelastic materials. One is based on a direct method of Laplace inversion and the other is an approximate method of collocation. Numerical values were obtained for stresses at the interfaces and for deformations at the surface and interfaces of the above systems, utilizing both methods. The following findings were obtained from an analysis of the effects of various parameters on stress and displacements in a two-layer incompressible system with each layer characterized by a Kelvin model: (1) At initial time, the stresses are determined by the viscosity ratio of the two dashpots, but at infinite time they are governed by the elasticity ratio of the two springs. (2) When both layers have the same retardation time, the stresses are independent of time and remain constant. (3) The surface and interface displacements at the axis of symmetry generally increase with time. (Author)

UCRL-14440 **Field 13M, 6R, 18C**
CFSTI Prices: HC$1.50 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
THEORETICAL CONSIDERATIONS, DESIGN, AND EVALUATION OF A CASCADE IMPACTOR,
by Jerry J. Cohen, and D. N. Montan. 20 Jun 66, 24p
Contract W-7405-eng-48

Descriptors: (*Cascade structures, Impact tests).

For abstract, see N 20 19.

AD-639 773 **See Field 20D**

AD-640 026 **See Field 13K**

AD-640 203 **See Field 14B**

AD-640 440 **See Field 18C**

PB-173 089 **See Field 13L**

PB-173 279 **See Field 13B**

PB-173 283 **See Field 11B**

14A. COST EFFECTIVENESS

AD-639 674 **Field 14A, 5I, 5A**
CFSTI Prices: HC$3.00 MF$0.75
Naval Personnel Research Activity, San Diego, Calif.
THE FEASIBILITY OF DERIVING A COST/EFFECTIVENESS FORMULA FOR MAN/MACHINE FUNCTION ALLOCATION.
Research memo.,
by Marilee N. Connelly. Sep 66, 72p SRM-67-4
Proj. PF-016020801

Descriptors: (*Man-machine systems, *Cost effectiveness), (*Management engineering, Cost effectiveness), Military personnel, Feasibility studies, Distribution.

In order to investigate the feasibility of developing a cost/effectiveness formula for man/machine function allocation, a preliminary cost/effectiveness formula was constructed and evaluated. Measures of cost and effectiveness, sources of data, and availability of data were investigated. Using the preliminary formula and methodology as a basis for the analysis, it was concluded that adequate measures of cost are available but that adequate measures of variable effectiveness have not yet been developed. Due to the complexity of the cost/effectiveness formula and methodology and to the lack of accessibility of input data, a large amount of time and money will be required to perform function allocation analyses. It was determined that the derivation of a cost/effectiveness formula for man/machine function allocation is feasible. At this time cost/effectiveness analysis seems applicable to most cases of function allocation and appears to offer a reliable method for the allocation of functions between men and machines. (Author)

K-OA-1313 **Field 14A, 18B**
CFSTI Prices: HC$3.00 MF$0.75
Oak Ridge Gaseous Diffusion Plant, Tenn.
TABLES OF 10-10 URANIUM UNIT COST COMPONENTS.
27 Jan 65, 94p
Contract W-7405-eng-26

Descriptors: (*Cost effectiveness, *Gaseous diffusion separation).

For abstract, see N 20 20.

AD-468 834 **See Field 5H**

AD-640 240 **See Field 1B**

ANL-6950 **See Field 18J**

14B. LABORATORIES, TEST FACILITIES, AND TEST EQUIPMENT

AD-281 838 **Field 14B**
CFSTI Price: HC$7.60
Sperry Gyroscope Co., Great Neck, N. Y.
DEVELOPMENT AND MANUFACTURE OF THE THREE-AXIS INTEGRATING ACCELEROMETER.
Summary rept.,
by H. Diamond, J. R. Mott, and H. J. Smith. 3 Feb 62, 75p CA-4230-0102-6
Contract DA-30-069-ORD-3420
Proj. DA-TN2-8106

Descriptors: (*Accelerometers, Production).

AD-469 988 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
STRAIN-SENSITIVE GAGE FOR MEASURING VIBRATIONS AT HIGH TEMPERATURE,
by V. Ya. Volodin. 28 Jun 65, 6p FTD-TT-65-203
Unedited rough draft trans. of Patent (USSR) 145 510, appl. 728376/26-10, 26 Apr 61.

Descriptors: (*Vibration, Measurement), (*Strain gages, Vibration), High-temperature research, USSR, Patents.

A strain-sensitive gage for measuring mechanical vibrations under conditions of high temperature has been designed. The gage has an elastic articulated element in the form of two cylinders with a common base. The articulated elements operate in antiphase. For the purpose of eliminating deformations of the cement coatings in it, the articulated element is designed with slits along the generatrix of the cylinders. (Author)

AD-470 147 **Field 14B**
CFSTI Prices: HC$3.00 MF$0.75
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
DESIGN AND INITIAL CALIBRATION OF A MAGNETIC SUSPENSION SYSTEM FOR WIND TUNNEL MODELS.
Technical rept., 1 Sep 59-31 Mar 65,
by C. D. Crain, M. D. Brown, and A. H. Cortner. Sep 65, 72p AEDC-TR-65-187
Contract AF 40 (600)-1200
Projs. AF-8952, ARO-VW3007
Task 895201
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Wind tunnel models, Suspension devices), (*Suspension devices, Wind tunnel models), Aerodynamic characteristics, Magnetohydrodynamics, Design, Calibration, Model tests, Drag, Feedback amplifiers, Pitch (Motion), Yaw, Lift, Magnetic fields.

Identifiers: Magnetic suspension systems.

The design, construction, and initial calibration of a prototype magnetic suspension system capable of supporting models in a wind tunnel are described. Magnetically supported models allow measurements free from the interferences produced by mechanical model supports. The described system is of the 'V'-type configuration and is compared to other types of configurations. Initial force calibration data are given, and it is concluded that quantitative force data would be difficult to obtain from the prototype suspension system because of the many interactions involved. Recommendations for future magnetic suspension system designs are included as well as a discussion of the types of aerodynamic testing where the use of such a system might be beneficial. (Author)

AD-639 645 **Field 14B, 6S**
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Medical Div., Air Force Systems Command, Brooks AFB, Tex.
AEROSPACE MEDICINE CONSIDERATIONS IN MANRATING SPACE ENVIRONMENT SIMULATORS,
by Paul W. Musgrave, and Donald I. Carter. Jun 66, 12p AMD-TR-66-2

Descriptors: (*Space simulation chambers, Safety), Test equipment, Operation, Design, Standards, Vacuum, Pressure suits, Personnel, Technicians, Space medicine, Safety devices, Monitors.

Manrating of space environment simulators has become a necessity to facilitate the operation of these devices and to carry out testing of equipment within near-vacuum conditions. Protection of the individual performing duty within these environment extremes has presented interesting problems to the physician, physiologist, and engineer. This paper describes the physical facility requirements and operational procedures which must be integrated to provide a satisfactory degree of safety for these personnel. (Author)

AD-639 716 **Field 14B**
Not available from CFSTI.
Ballistic Research Labs., Aberdeen Proving Ground, Md.
SUPERSONIC WIND TUNNELS LABORATORY BOMB TUNNEL CALIBRATION TEST NOZZLES M-1.7,
by A. E. Puckett, and H. W. Emmons. Apr 45, 35p BRL-541
Not reproducible by CFSTI standards.

Descriptors: (*Supersonic nozzles, Tests), (*Wind tunnel nozzles, Tests), Calibration, Supersonic flow, Velocity, Pressure, Model tests.

A series of tests was run to determine the performance of the first fixed supersonic nozzle constructed for the Aberdeen Bomb Tunnel, including velocity, pressure, and flow inclination distribution through the test section. It was determined that the average speed produced in the test section by this nozzle corresponded to a Mach Number of Ma=1.72, and that, although there were non-uniformities in the flow in the test section, the condition of the flow was satisfactory to permit reasonably accurate model testing. (Author)

AD-639 717 **Field 14B, 19D**
CFSTI Prices: HC$1.10 MF$0.50
Ballistic Research Labs., Aberdeen Proving Ground, Md.
CALIBRATION OF THE HOPKINS BLASTMETER,
by Daniel Shanks. 28 Jun 40, 7p Rept. no. 196

Descriptors: (*Meters, Blast), Calibration, Galvanometers, Measurement.

AD-639 742 **Field 14B**
Not available from CFSTI.
Queen's Univ., Belfast (Northern Ireland). Dept. of Physics.
NOTES ON THE EFFECT OF NOISE ON LANGMUIR PROBE CHARACTERISTICS,
by A. Garscadden, and K. G. Emeleus. 2 Nov 61, 10p
Contract AF 61 (052)-132
Proj. AF-7073
ARL-66-0176
Availability: Published in Proceedings of the Physical Society v79 pt3 n509 p535-41 1962.

Descriptors: (*Langmuir probes, Performance (Engineering)), Plasma medium, Oscillation, Electrons, Temperature, Space charges, Interference, Theory.

A partial analysis has been made of the effects of fluctuations in a plasma on the data obtained by conventional use of Langmuir probes. Consideration has been given to effects of periodic fluctuations of electron temperature, random current and space-potential, supposed independent of probe potential. For a wide range of conditions, the values of electron temperature obtained will be correct, but values of electron concentration underestimated. Experiments are described to check part of the theory, and the bearing of the experimental and theoretical results obtained on the probe analysis of discharges in which there are plasma electron oscillations is discussed briefly. (Author)

AD-639 962 **Field 14B, 20G, 22B**
CFSTI Prices: HC$2.00 MF$0.50
Lincoln Lab., Mass. Inst of Tech., Lexington.
LINCOLN ACCELERATOR LABORATORY.
Technical note,
by Charles L. Mack Jr. 2 Sep 66, 36p LL-TN-1966-12
Contract AF 19 (628)-5167
Proj. AF-649L
ESD-TR-66-430

Descriptors: (*Nuclear physics laboratories, *Particle accelerators), Design, Electrons, Protons, Radiation damage, Spacecraft.

Identifiers: Lincoln Laboratory.

A complete technical description of the Lincoln Accelerator Laboratory is given. The primary purpose of the laboratory is to conduct radiation-effects studies for space vehicles and components. Particle fluxes up to 68 inches in diameter are provided in a solar-vacuum chamber. These can be either monochromatic electrons at any energy from 300 kev to 4 Mev; electrons distributed in a Van Allen energy spectrum from 40 kev to 4 Mev, or monochromatic protons at any energy from 50 kev to 4 Mev. The general-purpose capabilities of the laboratory are described, equipment listed, and information concerning the facilities is given to enable the investigator to design his experiment for greatest convenience and compatibility. (Author)

AD-640 011 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Colorado State Univ., Fort Collins. Fluid Mechanics Program.
INSTRUMENT FOR MEASURING THE INTERMITTENCY OF QUASI-STEADY SIGNALS,
by C. L. Finn, and V. A. Sandborn. Oct 64, 21p
Paper-3
Nonr-1610 (08)

Descriptors: (*Measuring devices (Electrical + electronic), Signals), Alternating current, Circuits, Noise, Counting methods, Time, Analysis, Transducers.

A circuit is described which measures the percent of time an ac signal is non-zero. The circuit is demonstrated by analyzing the signal from a velocity transducer in turbulent air flow. Details of the measurement of intermittency in the presence of electronic noise are covered. Measurements with this new circuit are compared with intermittency values inferred from probability analysis of the signal, as well as direct graphical counting. (Author)

AD-640 073 **Field 14B, 5I**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Baltimore, Md. Engineering Lab.
TGS-1 ANTENNA SIMULATOR, MOD. 1.
Technical rept.,
by Ellwood J. King. 1 Oct 49, 6p
SPECDEVCEN-166-1-77
Reprinted Jan 1954.

Descriptors: (*Antenna simulators, Radar trainers), Radar targets, Simulation, Direction finding, Synchros.

Identifiers: TGS-1.

AD-640 203 **Field 14B, 19D, 13M**
CFSTI Prices: HC$3.00 MF$0.50
Ammann and Whitney, New York.
DESCRIPTION AND UTILIZATION OF A VERSATILE SLAB-SUPPORT TEST FACILITY. REPORT NO. 7. ESTABLISHMENT OF SAFETY DESIGN CRITERIA FOR USE IN ENGINEERING OF EXPLOSIVE FACILITIES AND OPERATIONS.
Technical rept.,
by Edward Cohen, Norval Dobbs, and Richard Rindner. Oct 66, 54p
Contract DA-28-017-AMC-423 (A)
PA-TR-3445
See also AD-640 025.

Descriptors: (*Explosive materials, Storage), (*Reinforced concrete, Explosion effects), (*Test facilities, Explosive materials), Safety, Processing, Structures, Instrumentation, Test equipment.

The report presents a detailed description and utilization of a multipurpose slab-support structure constructed in 1965 at the U.S. Naval Ordnance Test Station (NOTS), China Lake, California. Basically, the structure comprises three reinforced concrete blocks 8x8x9 feet, aligned longitudinally and separated by two blast relief spaces. Slabs can be tested either vertically or horizontally. Charges weighing up to 100 lbs. can be used in vertical testing and up to more than 500 lbs. in horizontal testing. Total weight of the structure is 170 tons. Instrumentation facilities include pressure gage mounts, deflection gage appurtenances, impulse gage plates, strain gage connections and embedded conduits for connecting other instruments. Provision also is made for high speed camera measurements of slab failure and fragment velocity measurement. Numerous illustrations of the use of the structure are included in the report. (Author)

AD-640 205 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Ballistic Research Labs., Aberdeen Proving Ground, Md.
PRESSURE SCANNER UNIT.
Technical note,
by R. Colburn. Jun 66, 21p BRL-TN-1616
Proj. RDT/E-1P222901A201

Descriptors: (*Pressure, *Scanning), Transducers, Wind tunnels, Recording systems.

A pressure scanner unit, capable of receiving a relatively large number of pressures and transmitting them to a small number of transducers for recording, has been developed at the Ballistic Research Laboratories. The air-operated unit also provides the facility for checking all pressure leads and connections, and providing a reference vacuum (or pressure) for transducer calibration. The unit presents a prototype for pressure scanners of any capacity. (Author)

AD-640 252 **Field 14B, 6H, 15E, 13D K**
CFSTI Prices: HC$3.00 MF$0.75
Army Natick Labs., Mass.
BIBLIOGRAPHY OF TECHNICAL PUBLICATIONS AND PAPERS, JANUARY 1965 - JUNE 1966.
Technical rept.
Jul 66, 75p TR-67-1

Descriptors: (*Army research, Reports), Bibliographies, Clothing, Organic materials, Food, Containers, Mechanical engineering, Air drop operations, Meteorology.

A bibliographic listing of technical publications and papers by the personnel of the U. S. Army Natick Laboratories and its contractors for the period January 1965 through June 1966. (Author)

AD-640 314 **Field 14B**
CFSTI Prices: HC$2.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
DYNAMIC CALIBRATIONS OF PRESSURE DETECTORS AT INFRASONIC FREQUENCIES,
by H. Gerber, and M. P. Eskin. 25 May 66, 41p
NOLTR-66-105
Proj. ORD-052-303/F108-08-10

Descriptors: (*Detectors, Pressure), (*Calibration, Detectors), Signals, Pulse generators, Errors.

Identifiers: Infrasonic frequency.

The report presents methods for producing pressure signals to check the performance of accurate, sensitive, infrasonic pressure detectors. Step, sinusoidal, uniformly-decreasing, and pulse pressure signals with precisely controlled magnitudes and durations are emphasized. The effects of slight, unavoidable deviations are discussed. (Author)

AD-640 318 **Field 14B**
CFSTI Prices: HC$2.00 MF$0.50
Army Nuclear Defense Lab., Edgewood Arsenal, Md.
MOSSBAUER-EFFECT SPECTROSCOPY,
by A. A. Temperley. Oct 66, 36p NDL-TM-33
Proj. 1N022601A086
Task 01

Descriptors: (*Mossbauer effect, Spectroscopy), (*Nuclear spectroscopy, Mossbauer effect), Instrumentation, Nuclear radiation spectrometers, Transducers, Cobalt, Gamma emission, Iron, Radioactive isotopes.

Mossbauer-effect spectroscopy is discussed with emphasis on spectrometer design. Construction of a Mossbauer-effect spectrometer using a loudspeaker as the velocity transducer, capable of operation with either constant velocities or with constant accelerations, is described. Resonance experiments with the 14.4-keV Mossbauer-effect gamma ray from Co57 (Fe57m) are used to describe the performance of the spectrometer. (Author)

AD-640 472 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
MULTIPOSITION MACHINE FOR TESTING FLAT SPECIMENS FOR FATIGUE,
by A. S. Nikishov, and I. A. Yarov. 18 Apr 66, 9p FTD-TT-65-1391
Unedited rough draft trans. of Patent (USSR) 167 055, appl 840633/25-8, 8 Jun 63.

Descriptors: (*Test equipment, Fatigue (Mechanics)), USSR, Patents, Vibrators (Mechanical), Heaters.

The object of the invention is a multiposition machine for testing flat specimens for fatigue with sign-varying (between plus and minus) bending consisting of a ring-shaped vibrator with changeable cam disks for creating in each specimen varying stresses which vary in magnitude, and an electric heater for heating the specimens being tested. For the purpose of changing the specimens being tested without stopping the machine, it is provided with removable tail spindles radially arranged around a ring-shaped vibrator and which serve for fastening the specimens that are being tested. (Author)

AD-640 516 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Royal Aircraft Establishment, Franborough (England).
HELIUM MASS-SPECTROMETER LEAK DETECTION.
Technical rept.,
by W. N. Mair. May 66, 18p TR-66158

Descriptors: (*Leak detectors, *Vacuum apparatus), (*Helium, Spectrum analyzers), Mass spectroscopy, Great Britain.

The measurement of leaks in vacuum components using helium mass-spectrometers is analysed mathematically and the necessary conditions for using a simple expression for an 'integrated burst' method of increasing sensitivity, are discussed. (Author)

N66-27237 **Field 14B**
CFSTI Prices HC$4.00 MF$0.75
Research Triangle Inst., Durham, N. C.
A FEASIBILITY STUDY OF A THIN FILM OXYGEN PARTIAL PRESSURE SENSOR FINAL REPORT, 8 DEC. 1964 - 7 JAN. 1966.
by J. J. Wortman. 1966, 110p NASA-CR-66084
Contract NAS1-4617

Descriptors: *Oxygen sensor, *Partial pressure, *Thin film, Conductance, Control, Diffusion, Effect, Film, Galvanic, Gas, Gold, Modulation, Oxidation, Oxygen, Partial, Pressure, Sensor, Thin.

For abstract, see S 04 15.

N66-27239 **Field 14B**
CFSTI Prices HC$6.00 MF$1.25
National Bureau Of Standards, Boulder, Colo. Cryogenics Div.

SLUSH HYDROGEN INSTRUMENTATION STUDY FINAL REPORT, 1 MAR. 1964 - 1 MAR. 1966.
by W. J. Alspach, T. M. Flynn, and R. J. Richards. 1 Mar 66, 211p NASA-CR-75314, NBS-8879
NASA ORDER CC-14032

Descriptors: *Flow meter, *Hydrogen, *Liquid level, *Slush, Cryogenic, Flow, Instrumentation, Level, Liquid, Measurement, Meter, Mixture, Quality, Solid.

For abstract, see S 04 15.

N66-27532 **Field 14B**
CFSTI Prices HC$3.00 MF$0.50
Brown Engineering Co., Inc., Huntsville, Ala. Research Labs.
A FEASIBILITY STUDY OF AN ADVANCED SPACE ENVIRONMENTAL EFFECTS SENSOR.
by R. W. Blanton Jr, W. L. Chisholm, and J. E. Scalf. Mar 66, 56p NASA-CR-75398, TR-192
Contract NAS8-20166

Descriptors: *Satellite instrumentation, *Space environment, *Temperature measurement, Analysis, Control, Design, Effect, Environment, Error, Instrumentation, Measurement, Satellite, Sensor, Space, Stability, Temperature, Thermal.

For abstract, see S 04 15.

N66-27742 **Field 14B**
CFSTI Prices HC$2.00 MF$0.50
Parametrics, Inc., Waltham, Mass.
ULTRASONIC TEMPERATURE MEASURING DEVICE THIRD QUARTERLY PROGRESS REPORT.
by E. H. Carnevale, S. L. Klaidman, and L. C. Lynnworth. Apr 66, 27p NASA-CR-54964
Contract NAS3-7981

Descriptors. *Magnetostriction, *Piezoelectricity, *Radiation effect, *Temperature measurement, *Ultrasonic wave transducer, Device, Effect, Material, Measurement, Radiation, Sensor, Temperature, Testing, Transducer, Ultrasonic, Wave.

For abstract, see S 04 15.

N66-27939 **Field 14B**
CFSTI Prices HC$4.00 MF$1.00
Princeton Univ., N. J. Dept. Of Aerospace And Mechanical Sciences.
TRANSIENT PRESSURE MEASURING METHODS RESEARCH SUMMARY TECHNICAL REPORT, 1 JAN. - 30 JUN. 1965.
by J. P. Thomas. 16 Nov 65, 147p NASA-CR-75632
Contracts NASR-36, NAS8-11216
Its Aeron. Eng. Rept.-595p

Descriptors: *Dynamic response, *Rocket engine, *Transducer, Adapter, Computer, Cooling, Diaphragm, Digital, Flush, Input, Laboratory, Motor, Passage, Pressure, Rocket, Shock, Small, Water.

For abstract, see S 04 15.

N66-27965 **Field 14B**
CFSTI Prices HC$4.00 MF$0.75
National Research Corp., Cambridge, Mass.
DEVELOPMENT OF AN ACCURATE WIDE RANGE ULTRA HIGH VACUUM GAUGE CALIBRATION METHOD.
by F. J. Brock, and P. Fowler. 1966, 112p
NASA-CR-75529
Contract NAS5-3967

Descriptors: *Atomic beam, *Cryopumping, *Ultrahigh vacuum, *Vacuum gauge, Atom, Beam, Calibration, Component, Conductivity, Electric, Error, Gauge, Orifice, Performance, Plug, Pressure, Range, System, Ultrahigh, Vacuum.

For abstract, see S 04 15.

N66-28023 **Field 14B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
INVESTIGATION OF THE DEFLECTION OF AN ELECTRON BEAM AS A MEANS OF MEASURING ELECTRIC FIELD STRENGTH.
by E. L. Shriver. 12 Apr 66, 30p NASA-TM-X-53435

Descriptors: *Deflection, *Electric field strength, *Electron beam, Beam, Chamber, Electric, Electron, Energy, Field, Gun, Intensity, Phenol, Plate, Strength, Teflon, Vacuum, Velocity.

For abstract, see S 04 15.

N66-28032 **Field 14B**
CFSTI Prices HC$4.00 MF$0.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
COMPONENT MAGNETIC TEST FACILITY OPERATIONS AND TEST PROCEDURE MANUAL.
by C. A. Harris, and C. L. Parsons. Jul 65, 104p
NASA-TM-X-55495, X-325-65-312

Descriptors: *Handbook, *Magnetic field, *Ogo, *Spacecraft component, *Test facility, Component, Facility, Field, Magnetic, Manual, Measurement, Operation, Procedure, Satellite, Spacecraft, Test.

For abstract, see S 04 15.

N66-28375 **Field 14B**
CFSTI Prices HC$2.00 MF$0.50
Bell Aerosystems Co., Buffalo, N. Y.
GEOS FINAL DESIGN REPORT.
by C. M. Whitby. 1966, 44p NASA-CR-65377
Contract NAS9-2988
Its Rept.-60009-517

Descriptors: *Display system, *Geodetic satellite, *Systems design, *Target simulation, Agena rocket, Color, Design, Display, Earth, Image, Orbital, Prototype, Quality, Resolution, Simulation, System, Target.

For abstract, see S 04 15.

N66-28376 **Field 14B**
CFSTI Prices HC$3.00 MF$0.75
Melpar, Inc., Falls Church, Va.
SPACEBORNE GAS CHROMATOGRAPH FINAL REPORT, 24 FEB. 1964 - 1 MAY 1966.
Apr 66, 95p NASA-CR-65379
Contract NAS9-2518

Descriptors: *Apollo spacecraft, *Detector, *Gas chromatography, Amplifier, Chromatography, Column, Component, Device, Electronics, Gas, Injection, Mechanical, Meter, Regulator, Selector, Valve, Vapor.

For abstract, see S 04 15.

N66-28378 **Field 14B**
CFSTI Prices HC$2.00 MF$0.50
Cambridge Systems, Inc., Newton, Mass.
DESIGN, DEVELOPMENT AND TESTING DEW POINT HYGROMETERS FOR THE N A S A/ GEMINI PROGRAM FINAL REPORT, 27 JUN. 1965 - 31 JAN. 1966.
31 Jan 66, 34p NASA-CR-65380
Contract NAS9-4793

Descriptors: *Gemini project, *Hygrometer, *Manned spacecraft, *Surface temperature, Ambient, Circuit, Control, Dew, Manned, Point, Sensor, Spacecraft, Surface, Temperature, Unit.

For abstract, see S 04 15.

N66-28381 **Field 14B**
CFSTI Prices HC$4.00 MF$1.00
Honeywell, Inc., Minneapolis, Minn. Systems And Research Div.
TRACE MATERIAL GENERATION RATE SIMULATOR (TRACE GAS SIMULATOR) FINAL REPORT.
by E. T. Tromborg. 5 May 66, 140p NASA-CR-65383
Contract NAS9-3998
Its Rept.-12503-fr1

Descriptors: *Simulator, *Spacecraft contamination, *Trace contaminant, Contaminant, Contamination, Crew, Engineering, Equipment, Gas, Human, Material, Organic, Spacecraft, Trace, Waste.

For abstract, see S 04 15.

N66-28483 **Field 14B**
CFSTI Prices HC$2.00 MF$0.50
Mechanical Technology, Inc., Latham, N. Y.
INVESTIGATION OF AN AXIAL-EXCURSION TRANSDUCER FOR SQUEEZE-FILM BEARINGS.
by C. Kissinger, F. K. Orcutt, and C. H. Pan. Dec 65, 42p NASA-CR-75696, MTI-65TR63
Contract NAS8-11678

Descriptors: *Gas bearing, *Resonant frequency, *Transducer, *Voltage, Apparatus, Axial, Bearing, Cone, Drive, Effect, Excursion, Experiment, Film, Frequency, Gas, Gyro, Motion, Preloading, Resonant, Squeeze.

For abstract, see S 04 16.

N66-28786 **Field 14B**
CFSTI Prices HC$5.00 MF$1.00
Illinois Univ., Urbana. Coordinated Science Lab.
THEORETICAL AND EXPERIMENTAL STUDIES OF THE UNDERLYING PROCESSES AND TECHNIQUES OF LOW PRESSURE MEASUREMENT FINAL REPORT.
by D. Alpert. Apr 66, 164p NASA-CR-75681, R-286
Grant NSG-376, Contract DA-28-043-AMC-00073/E/

Descriptors: *Adsorption, *Ion pump, *Ionization gauge, *Pressure gauge, *Suppressor, *Ultrahigh vacuum, *Vacuum system, Atmosphere, Gauge, Instrumentation, Ion, Ionization, Low pressure, Pressure, Pump, Spectrometer, System, Ultrahigh, Upper, Vacuum.

For abstract, see S 04 16.

N66-28899 **Field 14B**
CFSTI Prices HC$4.00 MF$1.00
Virginia Polytechnic Inst., Blacksburg.
PROCEEDINGS OF THE CONFERENCE ON THE ROLE OF SIMULATION IN SPACE TECHNOLOGY, PART A.
1964, 137p NASA-CR-64952
Conf. Held 17-21 Aug. 1964, Sponsored By Nasa And Nsf Its Eng. Extension Ser. Circ. No. 4, Pt. A

Descriptors: *Ionizing radiation, *Meteoroid, *Simulated emission, *Space simulation, *Vacuum system, Conference, Electromagnetic, Emission, Hazard, Ionizing, Law, Magnetic field, Particle, Radiation, Scaling, Simulation, Space, System, Technology, Vacuum.

For abstract, see S 04 16.

N66-29068 **Field 14B**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
A THEORETICAL INVESTIGATION OF SIMULATION IN EXPANSION TUBES AND TUNNELS.
by R. L. Trimpi. Jun 66, 61p NASA-TR-R-243

Descriptors: *Expansion, *Flight simulation, *Hypersonic wind tunnel, *Ideal gas, *Real gas, *Stagnation, Condition, Flight, Gas, Hypersonic, Hypervelocity, Ideal, Investigation, Pressure, Real, Shock, Simulation, Temperature, Theory, Tube, Tunnel, Variation, Wind tunnel.

For abstract, see S 04 16.

N66-29075 Field 14B
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
EVALUATION OF AN AUTOMATIC AEROSOL PARTICLE COUNTER FOR MEASURING THE AIRBORNE CONTAMINATION LEVEL IN A CONTROLLED ENVIRONMENT.
by T. W. Lewis. 24 Mar 66, 39p NASA-TM-X-53416

Descriptors: *Aerosol, *Clean room, *Contamination, *Measuring apparatus, *Particle counter, Airborne, Apparatus, Clean, Control, Counter, Environment, Level, Measuring, Particle, Room.

For abstract, see S 04 16.

N66-29364 Field 14B
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
A 3-INCH COMBUSTION DRIVE SHOCK TUBE FOR STUDYING CHEMICAL KINETICS.
by P. P. Polentz, and L. L. Presley. 1965, 43p NASA-TM-X-56497
Presented At The 23rd Semiann. Meeting Of The Supersonic Tunnel Assoc., New York, 3-4 May 1965

Descriptors: *Chemical kinetics, *Chemistry, *Combustion, *Shock tunnel, Control, Detonation, Dimensional, Drive, Flow, Gas, Helium, Hydrogen, Ignition, Instrumentation, Kinetics, One, Oxygen, Performance, Shock, Structural analysis, System, Test, Tube, Tunnel, Velocity, Wave.

For abstract, see S 04 16.

N66-29365 Field 14B
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
IMPROVEMENTS IN COMBUSTION SMOOTHNESS AND EFFICIENCY IN A LARGE SHOCK-TUBE DRIVER.
by D. L. Compton. 1965, 9p NASA-TM-X-56498
Presented At 23rd Semiann. Meeting Of The Supersonic Tunnel Assoc., New York, 3-4 May 1965

Descriptors: *Combustion efficiency, *Shock tunnel, Burning, Chamber, Combustion, Disturbance, Driver, Efficiency, Flow, Gas, Helium, Interface, Large, Loading, Mixture, Oscillation, Pressure, Radial, Shock, Smoothness, Tunnel.

For abstract, see S 04 16.

N66-29392 Field 14B
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
A UNIQUE SUSPENSION SYSTEM FOR LONGITUDINAL VIBRATION TESTING OF LARGE LAUNCH VEHICLES.
by G. V. Dixon, J. Pearson, and J. A. Schoenster. 1965, 24p NASA-TM-X-56859
Presented At The 35th Shock And Vibration Symp., New Orleans, 25-28 Oct. 1965

Descriptors: *Launch vehicle, *Spring, *Suspension system, *Vibration testing, Air, Automatic, Control, Dynamics, Longitudinal, Structure, Suspension, System, Testing, Vibration.

For abstract, see S 04 16.

N66-29413 Field 14B
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
TECHNIQUES OF IMPLEMENTING LAUNCH AUTOMATION PROGRAMS (SATURN IB SPACE VEHICLE SYSTEM).
by W. G. Bodie. 30 Jul 65, 22p NASA-TM-X-53274
Presented At The 4th Ann. Reliability And Maintainability Conf., Los Angeles, 30 Jul. 1965

Descriptors: *Automation, *Checkout equipment, *Digital computer, *Reliability, *Saturn ib launch vehicle, Checkout, Computer, Digital, Equipment, Ground, Guidance, Hardware, Launch, Manufacturing, Operation, Program, System.

For abstract, see S 04 16.

N66-29414 Field 14B
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
SOME PERFORMANCE CHARACTERISTICS OF THE LRC 3 3/4-INCH PILOT EXPANSION TUBE USING AN UNHEATED HYDROGEN DRIVER.
by J. J. Jones. 1965, 20p NASA-TM-X-56706
Presented At The 4th Hypervelocity Tech. Symp., Tullahoma, Tenn., 15-16 Nov. 1965

Descriptors: *Flow velocity, *Shock tunnel, *Static pressure, Diaphragm, Driver, Expansion, Flow, Gas, Hydrogen, Instrumentation, Measurement, Microwave, Performance, Pitot, Pressure, Reflection, Rupture, Shock, Signal, Static, Tube, Tunnel, Turbulence, Velocity, Wave.

For abstract, see S 04 16.

N66-29706 Field 14B
CFSTI Prices HC$3.00 MF$0.75
Baird-atomic, Inc., Cambridge, Mass.
PELLICLE BEAM SPLITTER FINAL REPORT, 15 FEB. - 31 DEC. 1965.
by W. Vaughan. 1966, 87p NASA-CR-75988
Contract NAS5-9555
Its Rept.-5331-fr

Descriptors: *Cellulose, *Infrared spectroscopy, *Plastic material, *Propylene, *Thin film, Beam, Coating, Development, Fabrication, Film, Infrared, Material, Nitrate, Pellicle, Plastic, Scattering, Spectroscopy, Splitting, Thin.

For abstract, see S 04 16.

N66-29711 Field 14B
CFSTI Prices HC$5.00 MF$1.00
Lockheed Missiles And Space Co., Sunnyvale, Calif.
EXPERIMENTAL STUDY OF STERILE ASSEMBLY TECHNIQUES. VOLUME II - APPENDIXES B AND C FINAL REPORT.
21 Mar 66, 178p NASA-CR-75979, M-56-65-1, VOL. II
Contracts NAS7-100, JPL-950993
Prepared For Jpl

Descriptors: *Bacteriology, *Sterilization, *Technology, Assembly, Box, Equipment, Experiment, Log, Specification, Technique, Vacuum, Work.

For abstract, see S 04 16.

N66-29725 Field 14B
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
MEASUREMENT OF THE MECHANICAL AND DYNAMIC CHARACTERISTICS OF RUBBER.
Izmereniye Mekhanicheskikh Dinamicheskikh Kharakteristik Rezin
by YE. V. Kuvshinskiy, and V. P. Volodin. May 66, 16p NASA-TT-F-10161
Transl. Into English From Pribory I Tekhn. Eksperim. (Moscow), No. 2, 1957 P 94-97

Descriptors: *Dynamic modulus, *Measuring apparatus, *Mechanical impedance, *Rubber, Apparatus, Characteristics, Contraction, Deformation, Dynamics, Elasticity, Impedance, Measurement, Mechanics, Modulus, Vibration.

For abstract, see S 04 16.

N66-35587 Field 14B
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
ENVIRONMENTAL TESTING OF SATELLITE-BORNE INSTRUMENTS. SPACE RADIO PATROL.
by K. Hirao, K. Maeda, and T. Obayashi. Jan 64, 17p NASA-TT-F-8580
Transl. Into English Of Papers Presented At The 2d Informal Symp. On Artificial Satellites, Japan, 9 Aug. 1963

Descriptors: *Conference, *Environmental testing, *Satellite instrumentation, *Space detection and tracking system (spadats) p, Detection, Environment, Instrumentation, Patrol, Radio, Satellite, Sp, Testing, Tracking.

For abstract, see S 04 21.

N66-35652 Field 14B
CFSTI Prices HC$4.62 MF$2.25
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
RESEARCH AND ADVANCED DEVELOPMENT. VOLUME I - SUPPORTING RESEARCH AND TECHNOLOGY FOR THE OFFICE OF SPACE SCIENCES AND APPLICATIONS, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION SEMIANNUAL REVIEW, JAN. 1 - JUN. 30, 1966.
by F. E. Goddard Jr. 31 Jul 66, 413p NASA-CR-77557, JPL-TM-33-296
Contract NAS7-100

Descriptors: *Lunar exploration, *Nasa program, *Planetary exploration, *Space science, Analysis, Astronomy, Atmosphere, Biology, Capsule, Chemistry, Diffraction, Exploration, Geology, Interferometry, Lunar, Physics, Planet, Planetary, Radiation, Radiometry, Reliability, Research, Science, Space, Spacecraft, Spectral, Spectroscopy, Sterilization, Technology, X-ray.

For abstract, see S 04 21.

N66-35671 Field 14B, 6R
CFSTI Prices HC$2.00 MF$0.50
Istituto Superiore Di Sanita, Rome (Italy). Laboratori Di Fisica.
AUTOMATIC APPARATUS FOR THE MEASUREMENT OF WEAK CURRENTS, PARTICULARLY SUITED FOR THE CALIBRATION OF RADIUM MEDICAL APPLIANCES.
Apparato Automatico Per La Misura Di Deboli Correnti E, In Particolare, Per La Taratura Di Preparati Di Radio
by F. Corti, C. Felic, and A. Vallone. 22 Apr 66, 29p ISS-66/17
In Italian, English Summary

Descriptors: *Electric current, *Measuring apparatus, *Tunnel diode, Apparatus, Circuit, Computer, Control, Current, Diode, Electric,

Measurement, Medicine, Parallel, Radiobiology, Radium, Temperature, Trigger, Tunnel.

For abstract, see S 04 21.

N66-35787 **Field 14B**
CFSTI Prices HC$1.00 MF$0.50
Speedring Corp., Warren, Mich.
X-RAY TELESCOPE EXPERIMENT PACKAGE FINAL PROGRESS REPORT, 12 OCT. 1965 - 15 MAR. 1966.
1966, 24p NASA-CR-77647
Contract NAS5-9690

Descriptors: *Aerobee rocket, *Electronics, *Instrument package, *Proportional counter, *Window, *X-ray telescope, Aluminum, Beryllium, Camera, Control, Counter, Description, Instrument, Package, Proportion, Shutter, Telescope, X-ray.

For abstract, see S 04 21.

N66-35906 **Field 14B**
CFSTI Prices HC$6.00 MF$1.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
HIGH-VACUUM TECHNOLOGY, TESTING, 154 MEASUREMENT MEETING COMPILATION OF PAPERS.
Aug 66, 230p NASA-TM-X-1268
Meeting Held 8-9 Jun. 1965

Descriptors: *Conference, *High vacuum, *Simulation, Adhesion, Boiling, Ceramic, Chamber, Cryogenics, Environment, Facility, Glass, Hazard, Heat transfer, High, Liquid, Measurement, Metal, Powder, Safety, Simulator, Space, System, Ultrahigh, Vacuum.

For abstract, see S 04 21.

N66-35940 **Field 14B**
CFSTI Prices HC$2.50 MF$0.75
Parametrics, Inc., Waltham, Mass.
TECHNIQUES FOR MOUNTING AN ULTRASONIC TEMPERATURE DEVICE FINAL REPORT.
by E. H. Carnevale, and L. C. Lynnworth. Feb 66, 95p NASA-CR-54979
Contract NAS3-6211

Descriptors: *Rocket chamber, *Temperature measurement, *Transducer, *Ultrasonics, Application, Chamber, Delay, Gas, Line, Measurement, Mounting, Probe, Pulse, Rocket, Technique, Temperature, Thrust, Vane.

For abstract, see S 04 21.

N66-35941 **Field 14B**
CFSTI Prices HC$2.50 MF$0.75
Warner And Swasey Co., Flushing, N. Y. Control Instrument Div.
POSSIBLE TECHNIQUES FOR OPTICAL MEASUREMENT OF TEMPERATURE AND CONCENTRATION PROFILES IN A SUPERSONIC RAMJET.
by B. Krakow, G. J. Penzias, and R. H. Tourin.
1966, 58p NASA-CR-66112, W ;S-TR-39
Contract NAS1-5533

Descriptors: *Optical measurement, *Supersonic jet, *Temperature profile, Concentration, Engine, Gas, Hot, Measurement, Optical, Profile, Ramjet, Scanning, Spectral, Supersonic, Technique, Temperature.

For abstract, see S 04 21.

N66-36264 **Field 14B**
CFSTI Prices HC$3.00 MF$0.75
Aeronutronic, Newport Beach, Calif.
INSTRUMENT DEVELOPMENT FOR THE BASE FLOW REGION OF A MULTINOZZLE BOOSTER VEHICLE FINAL REPORT, 23 JUN. 1965 - 22 JUN. 1966.
by A. B. Bauer. 22 Jun 66, 72p NASA-CR-77911, U-3663
Contract NAS8-20503

Descriptors: *Flow measurement, *Nozzle flow, *Rocket booster, Base, Booster, Dynamics, Field, Flow, Fluid, Measurement, Multiple, Nozzle, Probe, Region, Rocket, Two, Vehicle, Wire.

For abstract, see S 04 21.

N66-36322 **Field 14B**
CFSTI Prices HC$2.00 MF$0.50
General Electric Co., Ithaca, N. Y. Electronics Lab.
VISUAL THREE-VIEW SPACE-FLIGHT SIMULATOR FINAL REPORT.
1 Aug 64, 33p NASA-CR-65501
Contract NAS9-1375

Descriptors: *Space cabin simulator, *Visual system, Assembly, Attachment, Cabin, Color, Computer, Design, Digital, Display, Fabrication, Optical, Simulator, Space, Space vehicle, System, Television, Visual.

For abstract, see S 04 21.

PB-170 860 **Field 14B**
CFSTI Prices: HC$3.60 MF$0.50
Wisconsin Univ., Madison. Engineering Experiment Station.
VISCOSITY DETERMINATION USING THE FERRANTI-SHIRLEY CONE-AND-PLATE VISCOMETER,
by John D. Huppler. Apr 66, 31p EES-31

Descriptors: (*Viscosimeters, Operation), Theory, Calibration, Viscosity, Measurement.

The report outlines in detail the recommended operating procedure for the Ferranti-Shirley cone-and-plate viscometer of the Department of Chemical Engineering, University of Wisconsin. It includes a sketch of the theory for cone-and-plate viscometry, the results of various component tests, and a detailed operating procedure. (Author)

PB-170 928 **Field 14B, 11G**
CFSTI Prices: HC$3.60 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
MATERIEL CRYOGENIQUE (Cryogenic Equipment),
by Louis Leger, Jean Javellaud, Roger Guilguy, Olivier Testard, and Claude Caro. Jun 66, 36p
CEA-R-3008
Text in French; Summary in English.

Descriptors: (*Cryogenics, Materials), (*Laboratory equipment, Cryogenics), Cryostats, Liquefied gases, Containers, Nitrogen, Helium, Handling, France.

Cryostats are presented which were built from standard parts; this makes it possible to construct a great variety of apparatus at minimum cost. The liquid nitrogen and helium reservoirs were designed so as to reduce losses to a minimum, and so as to make the cryostats as autonomous as possible. The experimental enclosure which is generally placed in the lower part of the apparatus requires a separate study in every case. Furthermore, complete assemblies such as transfer rods, isolated traps and high vacuum valves were designed with a similar regard for the economic aspects and for the need for standardization. This equipment thus satisfies a great variety of experimental needs; it is readily adaptable and the consumptions of helium and liquid nitrogen are very low. (Author)

PB-170 960 **Field 14B, 3A, 7C, 20A K**
CFSTI Prices: HC$2.00 MF$0.50
Naval Research Lab., Washington, D. C.
REPORT OF NRL PROGRESS.
Aug 66, 43p
See also PB-170 713.

Descriptors: (*Naval research, Reports), (*Atmosphere models, Contamination), (*Radio astronomy, Telescopes), Chemistry, Metallurgy, Nuclear physics, Optics, Radio equipment, Mechanics, Underwater sound.

PB-173 135 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
LEVER-TYPE DIAL INDICATORS MINIMUM GRADUATION 0.0001, 0.0005 OR 0.001 INCH.
Technical manual instrument calibration procedure MD-01.
1 Jul 66, 9p
NAVAIR-17-20MD-01
This publication supersedes the interim edition released by the Metrology Engineering Center on 1 May 1964.

Descriptors: (*Meters, Calibration), Instruction manuals, Test methods, Test equipment, Measurement.

The procedure describes the calibration of lever-type dial indicators with a range of not more than 0 to 0.100 inch and minimum graduated intervals of 0.0001, 0.0005, or 0.001 inch as specified in MIL-I-18422C.

AD-640 177 **See Field 20B**

AD-640 181 **See Field 20F**

AD-640 245 **See Field 20I**

AD-640 297 **See Field 9A**

AD-640 305 **See Field 1C**

AD-640 430 **See Field 9C**

PB-170 936 **See Field 20L**

PB-173 133 **See Field 9C**

PB-173 136 **See Field 9C**

PB-173 137 **See Field 9C**

PB-173 143 **See Field 9C**

PB-173 144 **See Field 9C**

PB-173 204 **See Field 9C**

PB-173 251 **See Field 9C**

PB-173 262 **See Field 9C**

PB-173 309 **See Field 9C**

PB-173 337 **See Field 9C**

14C. RECORDING DEVICES

AD-464 392 **Field 14C**
CFSTI Price: HC$2.00
Royal Aircraft Establishment, Farnborough (England).
HIGH DENSITY DIGITAL RECORDING ON MAGNETIC TAPE.
Technical rept.,
by P. F. Dingwall, and G. R. Labrum. Jan 65, 36p
TR-65006

Descriptors: (*Magnetic recording systems, *Digital recording systems), Magnetic tape, Great Britain, Density, Electromagnetic pulses, Magnetic fields.

This report discusses the problems encountered in high area density digital recording on magnetic tape. Some aspects of the process of pulse recording are examined, and applied to the methods of

digital recordings in common use. A description is given of a system which offers advantages at high packing densities. (Author)

N66-27542 **Field 14C**
CFSTI Prices HC$2.00 MF$0.75
Lockheed Electronics Co., Edison, N. J. Industrial Technology Div.
ENDLESS LOOP MAGNETIC TAPE RECORDER FINAL REPORT.
Feb 66, 66p NASA-CR-75410
Contract NAS5-3914

Descriptors: *Magnetic tape recorder, *Recording instrument, Continuous, Design, Equipment, Head, Instrument, Isolation, Lock, Loop, Magnetic, Motor, Phase, Recorder, Recording, Servo, System, Tape, Vibration.

For abstract, see S 04 15.

N66-28785 **Field 14C**
CFSTI Prices HC$3.00 MF$0.75
Ampex Corp., Redwood City, Calif. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
INCREMENTAL MAGNETIC TAPE DRIVE MECHANISM FINAL REPORT, 23 AUG. 1965 - MAR. 1966.
1966, 97p NASA-CR-75788
Contracts NAS7-100, JPL-951289
Prepared For Jpl

Descriptors: *Drive, *Magnetic tape recorder, *Motor system, *Servomotor, Control, Design, Engineering, Evaluation, Fabrication, Magnetic, Mechanism, Model, Motor, Recorder, System, Tape, Testing.

For abstract, see S 04 16.

PB-173 139 **Field 14C**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Co., Seattle, Wash. Aerospace Group.
RECORDER MODEL 67-1200 (SANBORN COMPANY).
Technical manual instrument calibration procedure, AA-25.
1 Jul 66, 13p
Contract N123 (62861)35056A
NAVAIR-17-20AA-25
PB-168 779 superseded.

Descriptors: (*Recording systems, Calibration), Instruction manuals, Test methods.

The procedure describes the calibration of the Sanborn 67-1200 recorder.

PB-173 142 See Field 13I

14D. RELIABILITY

AD-639 918 **Field 14D, 9A**
CFSTI Prices: HC$2.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
DEVELOPMENT OF QUALIFICATION TECHNIQUES FOR HERMETICALLY SEALED FUSES.
Technical memo.,
by R. C. Coffin. May 66, 48p TG-824
Contract NOw-62-0604

Descriptors: (*Fuses (Electrical), Hermetic seals), (*Reliability (Electronics), Fuses (Electrical)), Satellites (Artificial), Transients, Performance (Engineering).

The report presents the development of qualification tests to be employed on fuses designated for use in satellites. Of particular interest is the development of a means of measuring the transient handling capability of a fuse. Means of measuring the maximum transient repetition rate and of detecting the quality of hermetic seals are also discussed. Included are two appendices, one describing the fuse determination procedure and the other discussing fuse theory. The idea basic to the problem of transient handling capability measurements is to determine the thermal rise time of a fuse and then to limit the possible current transients to less than that value. The thermal rise time, however, is found to be current-dependent. Hence we find, as we would intuitively suspect, that the parameter of interest is not the magnitude of current but the area under the current time curve. (Author)

AD-640 328 **Field 14D**
CFSTI Prices: HC$1.00 MF$0.50
Rome Air Development Center, Griffiss AFB, N. Y.
RELIABILITY AND MAINTAINABILITY RESEARCH IN THE UNITED STATES AIR FORCE,
by Joseph J. Naresky. Sep 66, 23p RADC-SP-66-2
Presented at the AIAA/SAE/ASME Reliability and Maintainability Conference (5th), 18-20 July 1966, Statler-Hilton Hotel, New York City, N. Y.

Descriptors: (*Reliability, Air force research), (*Maintainability, Air force research), Malfunctions, Control, Failure (Mechanics).

The paper describes the Air Force reliability and maintainability research program which has as its goal improved understanding, prediction, measurement, control, and correction of failure of component parts, equipment, and systems under the diverse stresses and environmental conditions encountered in Air Force operations. (Author)

N66-28042 **Field 14D**
CFSTI Prices HC$3.00 MF$0.75
Research Triangle Inst., Durham, N. C.
DEVELOPMENT OF RELIABILITY METHODOLOGY FOR SYSTEMS ENGINEERING. VOLUME I - METHODOLOGY - ANALYSIS TECHNIQUES AND PROCEDURES FINAL REPORT.
by C. A. Krohn, A. C. Nelson, and W. J. Thompson. Apr 66, 68p NASA-CR-75670
Contract NASW-905

Descriptors: *Failure, *Quality control, *Reliability, Analysis, Component, Control, Design, Electric, Electronic, Equipment, Mechanical, Performance, Prediction, Probability, Quality, Stress, Theory.

For abstract, see S 04 15.

N66-28043 **Field 14D**
CFSTI Prices HC$6.00 MF$1.25
Research Triangle Inst., Durham, N. C.
DEVELOPMENT OF RELIABILITY METHODOLOGY FOR SYSTEMS ENGINEERING. VOLUME II - APPLICATION - DESIGN RELIABILITY ANALYSIS OF A 250 VOLT-AMPERE STATIC INVERTER FINAL REPORT.
by A. C. Nelson, and C. D. Parker. Jul 66, 222p NASA-CR-75671
Contract NASW-905

Descriptors: *Electric equipment, *Reliability, *Static inverter, Analysis, Design, Electric, Equipment, Failure, Inverter, Method, Model, Performance, Prediction, Static.

For abstract, see S 04 15.

N66-29409 **Field 14D**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE STATUS OF RELIABILITY ASSESSMENT FOR UNMANNED SATELLITES.
by W. W. Wolman. 1965, 15p NASA-TM-X-56754
Presented At The 11th Natl. Symp. On Reliability And Quality Control, Miami Beach, Fla., 13 Jan. 1965, And At The Am. Soc. For Quality Control, Cumberland Sect., 2d Western Md. All-day Quality Control Conf., Cumberland, Md., 18 Oct. 1965

Descriptors: *Failure, *Quality control, *Spacecraft reliability, *Unmanned spacecraft, Assessment, Component, Control, Mathematics, Model, Quality, Reliability, Satellite, Spacecraft, System, Technique, Unmanned.

For abstract, see S 04 16.

AD-469 269 See Field 5B

AD-639 703 See Field 12B

AD-639 719 See Field 12A

AD-640 136 See Field 12B

AD-640 156 See Field 9A

AD-640 269 See Field 12A

AD-640 312 See Field 13J

AD-640 426 See Field 5I

14E. REPROGRAPHY

AD-639 811 **Field 14E**
Not available from CFSTI.
Graduate Aeronautical Labs., Calif. Inst. of Tech., Pasadena.
HIGH-SPEED MOTION PICTURE PHOTOGRAPHY AS A TECHNIQUE TO STUDY CRACK PROPAGATION,
by W. M. Beebe, M. E. Jessy, and M. L. Williams. 1965, 4p GALCIT-Pub-614
Contract AF 33 (616)-6270
Presented at the National Metals/Materials Congress Philadelphia, October 19, 1964.
Availability: Published in Metals Engineering Quarterly p48-51 May 1965.

Descriptors: (*High-speed photography, Fracture (Mechanics)), High-speed cameras, Kerr cells, Flash lamps, Performance (Engineering).

Major modifications in the design of the optical bench and in increasing the intensity of the light source used in conjunction with a high-speed framing camera permit reflected light photography of metal surfaces at framing rates of 100,000 frames per sec. Crack propagation in crystals and metals has been observed. (Author)

N66-29387 **Field 14E**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
AN EXPANSION OF THE EV SYSTEM.
by W. F. Lindsey. 1965, 9p NASA-TM-X-56633
Presented At The 10th Ann. Tech. Symp. Of The Soc. Of Photo-opt. Instr. Engr., San Francisco, 16-20 Aug. 1965

Descriptors: *Exposure, *Photography, Brightness, Electronic, Equation, Filter, Flash, Intensity, Light, Photometry, System, Table, Transmittance, Value.

For abstract, see S 04 16.

N66-29450 **Field 14E**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
AN EXPANSION OF THE EV SYSTEMS.
by W. F. Lindsey. 1965, 7p NASA-TM-X-56765
Presented At The 10th Ann. Tech. Symp. Of The Soc. Of Photo-optical Instr. Engr., San Francisco, 16-20 Aug. 1965

Descriptors: *Electronic photography, *Exposure, *Filter, *Transmittance, Additive, Brightness, Electronic, Equation, Film, Flash, Photography, System, Table, Value.

For abstract, see S 04 16.

N66-36054 Field 14E
CFSTI Prices HC$1.00 MF$0.50
Rutgers Univ., New Brunswick, N. J. Dept. Of Mechanical Engineering.
A COLOR SCHLIEREN SYSTEM.
by W. G. Hill Jr. and T. J. Kessler. Nov 65, 23p
NASA-CR-77800
Its Tech. Rept.- 105-me-f

Descriptors: *Color photography, *Fluid mechanics, *Gas flow, *Schlieren photography, Color, Compressible, Development, Flow, Fluid, Gas, Mechanics, Photography, Schlieren, System.

For abstract, see S 04 21.

PB-173 063 Field 14E
CFSTI Prices: HC$2.00 MF$0.50
Johns Hopkins Univ., Baltimore, Md. Dept. of Physics.
SIMPLIFIED TECHNIQUES FOR CALIBRATING PHOTOGRAPHIC EMULSIONS,
by H. M. Crosswhite, and G. H. Dieke. Sep 53, 30p Bumblebee-202
Contract NOrd-8036
AD-26 094

Descriptors: (*Photographic emulsions, Calibration), (*Calibration, Instrumentation), Microphotometers, Photographic techniques, Photographic plates, Intensity, Density, Optical phenomena.

A satisfactory plate-calibration method is necessary when photographic intensity measurements are to be made. Conventional methods produce a characteristic calibration curve which is not a straight line, and which, therefore, introduces complications into the calibration technique. The purpose of this study is to find a simple way to produce a straight-line curve. To do this, a number of photographic emulsions were tested; plotting the simple Seidel function, rather than the optical density, of the plate as a function of the logarithm of the intensity sufficed, in many cases, to produce a straightline curve. In those cases where some curvature remained with the use of this function, a simple adjustment in the microphotometer made possible the use of a variation of the Seidel function, which, in turn, gave the desired straight-line characteristic curve. (Author)

AD-639 661 See Field 20F

AD-640 439 See Field 20E

15A. ANTISUBMARINE WARFARE

AD-639 921 Field 15A, 12B
CFSTI Prices: HC$2.00 MF$0.50
Naval Postgraduate School, Monterey, Calif.
SEARCH AND EVASION GAMES.
Technical rept./research paper,
by Roger G. Schroeder. Jun 66, 39p TR/RP-68

Descriptors: (*War games, Evasion), (*Search theory, *Game theory), Sequential analysis, Mathematical models, Stochastic processes, Antisubmarine warfare.

The author develops some two-person zero-sum formulations of search and evasion problems. By employing a game theoretic approach, he allows the hider, as well as the searcher, to choose a strategy. This is in contrast to most search models which assume a stationary or passive hider. Both non-sequential and sequential search games are investigated. Some interesting aspects of the non-sequential game and an example of an antisubmarine search problem are given. The sequential games consist of a sequence of moves. When the players move, they not only determine a payoff but also the probability that the game terminates before the next move. When at most a finite number of moves is allowed, he proves that a solution may be found by solving a recursive sequence of matrix games. When the number of moves is not bounded, the game is characterized by a special type of non-linear program. The solution to this program can be approximated by successive perturbations of a related linear program. He obtains the result that a pair of strategies minimaxes the expected duration of the game if and only if these strategies also maximin the probability of termination in one step. (Author)

AD-639 782 See Field 17G

AD-639 783 See Field 17G

15B. CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL WARFARE

AD-640 016 Field 15B, 6F, 2A, 6O K
CFSTI Prices: HC$3.00 MF$0.75
Aerospace Technology Div., Library of Congress. Washington, D. C.
CBE FACTORS: MONTHLY SURVEY NO. 9.
ATD Work Assignment no. 50.
1966, 89p ATD-66-110
TT-66-62388
See also AD-638 368.

Descriptors: (*Chemical warfare agents, Reviews), (*Biological warfare agents, Reviews), (*Environment, Reviews), Pesticides, Herbicides, Fertilizers, Hallucinogens, Organic phosphorus compounds, Micrometeorology, Epidemiology, Aerosols, Ecology, Soils, USSR.

The monthly survey is based on Communist World open sources. It is the ninth in a series of monthly surveys covering the following areas: I. Chemical factors (pesticides, herbicides, fertilizers, psychotomimetics, other chemicals); II. Biological factors (pathogens); III. Environmental factors (aerosols, ecology, micrometeorology, soil science).

15C. DEFENSE

AD-639 713 Field 15C, 5C
CFSTI Prices: HC$2.00 MF$0.50
Hudson Inst., Inc., Harmon-on-Hudson, N. Y.
MODELS OF THE POSTATTACK ECONOMY.
by Robert U. Ayres. 1 Aug 66, 45p HI-648-RR
Contract OCD-PS-65-64

Descriptors: (*Civil defense systems, *Economics), Management planning, Mathematical models, Industries.

Some of the limitations of input-output models as they are currently used are summarized. They are static, i.e., a set of steady equilibrium interindustry flow patterns is assumed. The sectors are assumed to be homogeneous, which implies that every component of a sector is indistinguishable and interchangeable with every other component. Interindustry coefficients are usually assumed to be rigidly fixed and independent of supply and demand. All models to date are geographically aggregative. The objective function (GNP) maximization procedure is usually ambiguous: exogenous policy considerations are inextricably mixed up with endogenous demand considerations.

AD-639 751 Field 15C
CFSTI Prices: HC$2.00 MF$0.50
Hudson Inst., Inc., Harmon-on-Hudson, N. Y.
METHODOLOGY FOR POSTATTACK RESEARCH.
Research rept.,
by Robert U. Ayres. 1 Aug 66, 46p HI-647-RR
Contract OCD-PS-65-64

Descriptors: (*Civil defense systems, Scientific research), Behavior, Sociology, Radiation effects, Nuclear explosion damage.

The report discusses the methodology of postattack research. A hierarchical approach is described, in which the objects of analysis range from simple organisms and artifacts to complex human societies and ecosystems. The notion of 'response' to a perturbation which is appropriate for simple systems is extended to encompass the wider notion of 'disutility' in describing the effects of a nuclear attack on the economy or the society of the nation as a whole. The appropriate uses of devices such as scenarios, games, case histories, metaphors and models for various purposes is discussed. The major point is that non-rigorous constructs may be extremely helpful in training, raising the level of the discussion, and generating insights, but cannot be used for predictive purposes as models can. A 'state-of-the-art' estimate of various models is included. (Author)

AD-639 801 Field 15C, 12B
CFSTI Prices: HC$1.00 MF$0.50
Naval Weapons Lab., Dahlgreen, Va.
AN APPROXIMATION FOR N, THE UPPER 100GAMMA% CONFIDENCE BOUND ON THE NUMBER OF THE TRIAL ON WHICH THE rth SUCCESS OCCURS IN A BERNOULLI EXPERIMENT.
Technical memo.,
by M. A. Thomas. Sep 66, 11p NWL-TM-K-55/66

Descriptors: (*Weapon systems, Effectiveness), (*Statistical analysis, Ordnance), Binomials, Experimental data, Probability.

Identifiers: Bernoulli experiment, Hit probability.

The memorandum provides a close approximation to N, the upper 100gamma% confidence bound on the number of the trial on which the rth success occurs in a sequence of Bernoulli trials, when p, the probability of success on a single trial, is small. Constants which are used in the approximation are derived for r = 1, 2, and 3, and gamma = 0.90, 0.95, and 0.99, and the methodology for their derivation is set forth for extended values of r and gamma. (Author)

AD-640 206 Field 15C
CFSTI Prices: HC$2.00 MF$0.50
Federal Aviation Agency, Washington, D. C.
DEFENSE READINESS: SELECTED REFERENCES.
Mar 64, 42p Bibliographic List-11

Descriptors: (*Civil defense systems, Bibliographies), Civil defense personnel, Training, Fallout shelters, Communication systems, Transportation, Public health, Psychology, Medicine, Radiological contamination, Radiation monitors, Decontamination, Civil aviation, Survival, Agriculture, Industries.

AD-639 710 See Field 13B

15E. LOGISTICS

AD-640 235 Field 15E, 9A
CFSTI Prices: HC$5.00 MF$1.00
Department of the Army, Washington, D. C.
TECHNOLOGY AND ARMAMENT, NO. 4, 1966.
1 Aug 66, 159p J-0203
TT-66-62416
Trans. of Tekhnika i Vooruzhenie (USSR) n4 95p 1966. See also AD-626 282.

Descriptors: (*Military publications, USSR), Armed forces supplies, Armament, Steam power plants, Automation, Measuring devices (Electrical + electronic), Radio equipment, Electron tubes, Space probes, Corrosion, Steering, Vehicles, Astronautics, Hydraulic systems.

Identifiers: Technology.

The April 1966 issue of the Russian periodical includes such items as V. I. Lenin and military equipment; steering control; steam power plants; the phantastron; automation and control; planning in the training process; radio measurement; anticorrosive protection and maintenance of military equipment; emulsifiers instead of sodium hydroxide for degreasing; lunar, Venus, and Mars probes; reliability in aviation engineering; astronautics; metal corrosion; and the steering of combat vehicles.

PB-173 016 **Field 15E, 9B**
CFSTI Prices: HC$6.00 MF$1.25
California Univ., Los Angeles. Dept. of Engineering.
TRANSIM USER'S MANUAL.
May 66, 231p Rept. no. 66-6
Contract Cc-6220
See PB-173 017 for the IBM-1401 and 7090/7094 punched cards.

Descriptors: (*Transportation, Simulators), (*Programming (Computers), Transportation), Instruction manuals, Traffic, Systems engineering, Digital computers.

Identifiers: TRANSIM.

The TRANSIM transportation simulator was developed at the University of California, Los Angeles, to fill the need for a general-purpose computer simulation method which is simple and economical to use for a wide variety of problems in transportation; these may concern different modes, traffic types, firm sizes, or system situations. The User's Manual describes the simulator and delineates the procedures for its use. The User's Manual also discusses topics of more general interest, such as the concept of the systems approach, and the difference between mathematical models and computer simulators such as TRANSIM.

PB-173 017 **Field 15E, 9B**
CFSTI Price: HC$17.00
California Univ., Los Angeles. Dept. of Engineering.
TRANSIM: DECKS OF PUNCHED CARDS FOR THE IBM-1401 AND 7090/7094.
May 66, 1498p Rept. no. 66-6
Contract Cc-6220
See PB-173 016 for Transim User's Manual.

Descriptors: (*Transportation, Simulators), (*Punched cards, Programming (Computers)), Digital computers.

Identifiers: TRANSIM.

PB-173 215 **Field 15E**
CFSTI Prices: HC$5.00 MF$1.00
California Univ., Los Angeles. Dept. of Engineering.
PROCEEDINGS. MARITIME CARGO SYMPOSIUM.
18 Sep 64, 194p
A two-day Conference September 17 and 18, 1964 at the Port of Long Beach Administration Building Long Beach, California. Prepared in cooperation with Maritime Administration U. S. Department of Commerce.

Descriptors: (*Shipping (Marine), Symposia), (*Cargo, Shipping (Marine)), Handling.

Contents: A fresh approach to the cargo handling problem, by Nicholas Johnson; Developments in ports and port operations, by B. W. Hoffmaster; Developments in inland transportation, by J. Robert Mackey; Developments in inland transportation, by T. A. Fante; Unitization and its implications, by Fred Muller, Jr.; Recent developments in marine cargo handling systems, by Andrew E. Gibson; Experience with the M and M agreement, by Harry Bridges; Janot--A new concept in military terminals, by Brig. Gen. Raymond C. Conroy; Department of Defense experiences in maritime cargo handling, by A. S. Childers; A shipper's perspective, by F. R. Wilcox; Institutional constraints to marine terminal activities, by Edward Schmeltzer; The maritime port-complex simulator, by A. M. Feiler; Future horizons in maritime cargo transportation, by Edward M. MacCutcheon; European port development, by L. L. Whiteneck.

AD-639 732 **See Field 5D**

AD-640 252 **See Field 14B**

PB-172 870 **See Field 5B**

15F. NUCLEAR WARFARE

AD-640 431 **Field 15F, 20D**
CFSTI Prices: HC$3.00 MF$0.75
Aerospace Technology Div., Library of Congress, Washington, D. C.
NUCLEAR WEAPON DYNAMICS: COMPILATION OF ABSTRACTS.
Rept. no. 2 on ATD Work assignment no. 72.
by Simon Kassel. 13 Jun 66, 84p ATD-66-70
TT-66-62458
Based on Soviet open sources pub. 1963-1966. Rept. on Surveys of Foreign Scientific and Technical Literature.

Descriptors: (*Nuclear weapons, Dynamics), (*Aerodynamics, Nuclear weapons), Abstracts, Bibliographies, Hypersonic flow, Nonequilibrium flow, Boundary layer, Plasma medium, Thermodynamics, USSR.

The report is divided into the following sections: (1) Aerodynamic flow fields at hypersonic velocities, (2) Nonequilibrium processes, (3) Boundary layer at hypersonic velocities, (4) High-velocity impact, (5) Plasma--vehicle interaction, (6) Gas--solid surface interaction, (7) Thermal effects.

15G. OPERATIONS, STRATEGY, AND TACTICS

AD-640 057 **Field 15G, 5H, 17B**
CFSTI Prices: HC$3.00 MF$0.75
Computer Research Corp., Newton, Mass.
A STUDY OF CONVERSATIONAL ON-LINE INTERACTION IN MAN-MACHINE WAR GAMING.
Final rept.,
by Lewis C. Clapp, Robert V. Jacobson, Dale E. Jordan, and Ellen J. Wax. Aug 66, 75p R-102-4
Contract Nonr-4861 (00)
Proj. J-102

Descriptors: (*War games, *Man-machine systems), Programming (Computers), Remote control systems, Programming languages, Voice communication systems.

Identifiers: Time sharing (Computers), JOSL, CONSORT.

The report describes the results of a study of war gaming using on-line interaction between man and computer. The study concludes that analysis and war gaming capabilities can be increased significantly using a time-sharing computer system with appropriate software and remote-access terminals. A system concept called CONSORT (CONversational System with On-Line Remote Terminals) is described, and specifications are given for a user-oriented, conversational language, JOSL, which is designed specifically for simulation and analysis applications. CONSORT includes an automated data library, computer programming management features, and the capability to operate computer programs written in languages other than JOSL. Computer-aided manual gaming using CONSORT is described. (Author)

AD-640 162 **See Field 5E**

AD-640 435 **See Field 11C**

16A. MISSILE LAUNCHING AND GROUND SUPPORT

AD-467 842 **Field 16A**
CFSTI Prices: HC$3.00 MF$0.75
Army Missile Command, Redstone Arsenal, Ala.
PROTECTIVE LAUNCHERS FOR MISSILES AND ROCKETS,
by C. M. Cornelison, and O. R. Stoddard. 28 May 65, 63p
Proj. 1A013001A0391310
AMC-RL-TR-65-2

Descriptors: (*Guided missile launchers, Protective coverings), Design, Logistics, Manufacturing methods, Quality control, Storage, Handling, Environmental tests, Reliability, Packaging, Transportation, Containers.

Missile systems have generally been confined to having the missile separated from the launcher in a shipping and storage container. Only during a tactical operation has the missile and launcher become a unit. When the missile has been removed from the container, protection from environmental protection to the missile (s) is highly desirable. This report is intended as a guide for use in the development of protective launchers.

AD-640 374 **See Field 13L**

16D. MISSILES

AD-478 914 **See Field 20D**

17A. ACOUSTIC DETECTION

AD-461 882 **Field 17A**
CFSTI Price: HC$4.60
General Electric, Co., Syracuse, N. Y. Heavy Military Electronics Dept.
SONAR CAVITATION SUPPRESSION (TO OBTAIN HIGH PERFORMANCE SONAR). VOLUME II.
Final rept.
1964, 47p
Contract NObsr-85237
Task 8110

Descriptors: (*Sonar, Optimization), Performance (Engineering), Cavitation, Models (Simulations), Water, Tensile properties, Sonar domes, Transducers.

The objective of this investigation is to learn how to operate sonar transducers at power levels above the commonly accepted limit at which cavitation occurs, but without cavitation. This can be done when the ocean water surrounding a sonar transducer or sonar dome possesses tensile strength. Tensile strength in effect acts as if additional statis head were present at the transducer. Proper materials and constructional techniques must be used on a transducer or a sonar dome to permit this tensile strength to be utilized. The conclusion is that considerable performance gains can often be achieved by using the techniques developed in this program. A high-performance, noncavitatlng sonar system, utilizing tensile strength, appears feasible on the basis of the tests performed. (Author)

PB-170 808 **Field 17A, 9E**
CFSTI Prices: HC$3.00 MF$0.75
American Electronic Labs., Inc., Springfield, Va.
MODIFICATION OF GENERAL AVIATION TRANSPONDER TO INCORPORATE A CRYSTAL VIDEO RECEIVER. PHASE 1: INFINITE SKIRT SELECTIVITY; PHASE 2: GAT MK I; PHASE 3: GAT MK II.
Final rept.
Dec 65, 69p
Contract ARDS-620
Proj. FAA-242-006-02
SRDS-RD-65-123
See also PB-170 804.

Descriptors: (*Transponders, Crystal video receivers), (*Crystal video receivers, Transponders), Air traffic control systems, Design, Crystal detectors, Channel selectors, Radiofrequency amplifiers, Viedo amplifiers, Performance engineering, Radar beacons, Airborne.

Identifiers: Nuvistors.

The project was divided into three phases as follows: (1) Infinite skirt selectivity crystal video-receiving system. Equipment was developed for an infinite skirt selectivity crystal video receiving system. A pulse comparator was designed to gate the signal and thus to achieve the infinite skirt selectivity. However, pulse distortion in the cavity of the pulse comparator made it impossible for the system to work over the required dynamic range. (2) GAT MK I. The contract was amended to permit further development of a crystal video receiver using the previously developed equipment in phase 1 and a three-sectioned cavity preselector. This modification was developed, installed, and tested. The unit was within specification at room temperature except for the side lobe suppression. The side lobe suppression was out of specification at both ends of the power input dynamic range. (3) GAT MK II. The contract was again amended to permit further research and development of a receiver. A crystal video receiver was developed for installation in another GF Wilcox GAT, this time using a GF nuvistor RF amplifier instead of the transistor RF amplifier used in GAT MK I. In addition, several components of the basic crystal video receiver was redesigned to improve performance or to reduce cost or weight. This modification was developed, installed, and tested. (Author)

AD-463 491 **See Field 20A**

17B. COMMUNICATIONS

AD-473 393 **Field 17B, 20N**
CFSTI Prices: HC$6.00 MF$1.25
Navy Electronics Lab., San Diego, Calif.
ANTIPODAL-FIELD MEASUREMENTS OF VLF TRANSMITTER NPM AT STATIONARY SITES.
Research and development rept.,
by F. P. Snyder, J. E. Bickel, and M. R. Paulson. 27 May 65, 201p NEL-1294
Proj. SR-008-01-01
Task 7039

Descriptors: (*Radio signals, Very low frequency), (*Radio transmission, Radio signals), Phase modulation, Amplitude modulation, Africa, Measurement, Hawaii, Propagation, Antenna radiation patterns, Electromagnetic waves, Antennas, Loop antennas, Signal-to-noise ratio, Frequency meters, Radio interference.

Identifiers: AN/URM 139.

Time variations of antipodal fields of NPM, broadcasting on 19.8 kc/s in Hawaii, were measured at four fixed stations from 11 to 29 July 1963. Amplitude data are presented in terms of absolute field intensity. A preliminary analysis of the data is presented. (Author)

AD-639 964 **Field 17B, 5G**
CFSTI Prices: HC$6.00 MF$1.25
Philco Corp., Blue Bell, Pa.
SYNTHETIC SPEECH STUDY.
Final rept. 1 Jul 65-30 Jun 66,
by J. Bogusz, R. Smith, and G. Strohmeyer. 30 Jun 66, 251p Rept. no. 2659-F
Contract DA-02-086-AMC-0300 (E)
Proj. DA-1E6-34301-D244
Task 1E6-34301-D244-03
ECOM-0300-E-F
See also AD-611 082.

Descriptors: (*Speech representation, Effectiveness), (*Voice communication systems, Intelligibility), Measurement, Phonetics, Degradation, Signal-to-noise ratio, Sound signals, Speech recognition, Probability, Simulation, Programming (Computers), Speech.

Identifiers: CORODIM, Phonemes, Articulation index, SCIM, Consonants, Words.

The report describes a technique to automatically evaluate the intelligibility of speech transmitted over a communication channel. The technique is called CORODIM (Correlation Of the Recognition Of Degradation with Intelligibility Measurements). It transmits a test signal composed of speech-like sounds representative of phoneme consonants, and measures, by means of spectral channel analysis, the degradation suffered by each of the test signal constituents. The degradation manifests itself as an 'effective noise spectrum' which is measured and matched to one of a library of reference noise spectra. By means of the spectrum matching operation and a measurement of signal-to-noise ratio each constituent sound of the test signal is assigned a probability of recognition. These values are weighted by phoneme probability of occurrence factors, summed, and normalized to obtain a score representative of word intelligibility based on either initial or final consonant recognition of CVC-type words. CORODIM evaluates scores for both initial and final consonants and takes their product for the overall word intelligibility score. The part of the CORODIM technique following the spectral analysis operation was computer simulated. The technique was checked against word articulation scores under identical speech link conditions. Two types of speech degradations were considered. The first was additive noise having the same spectral characteristics as that used in deriving the library of phoneme recognition probability data. The second type was degradation produced under laboratory simulated speech link conditions. (Author)

AD-639 965 **Field 17B**
Not available from CFSTI.
Defence Research Medical Labs., Toronto (Ontario).
DIVERS' COMMUNICATIONS IMPROVED.
Technical note,
by Keith K. Neely. 18 May 66, 1p DRML-TN-633
Availability: Published in Science v153 n3733 p321 Jul 15 1966.

Descriptors: (*Underwater communication systems, Speech transmission), (*Voice communication systems, Underwater equipment), Diving, Transducers, Bone, Conductivity, Speech, Intelligibility.

AD-640 028 **Field 17B, 9D**
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
A DETERMINATION OF THE OUTPUT RESPONSE OF A LINEAR PULSE COMPRESSION NETWORK TO A SINGLE FREQUENCY INPUT PULSE OF ARBITRARY LENGTH.
Memo. rept.,
by R. M. Crisler. Aug 66, 22p NRL-MR-1722

Descriptors: (*Pulse compression, Networks), Information theory, Pulse communication systems, Fourier analysis, Pulse amplitude modulation.

A theoretical analysis has been made to determine the response of a pulse compression network to a single frequency pulse of arbitrary length. The purpose of this analysis was to determine if minimum detectable signal measurements made on a pulse compression receiver were meaningful when done with a single frequency test pulse. It has been shown that little amplitude degradation occurs through the pulse compression network if the single frequency test pulse is longer than the product of the recompressed pulse length and the square root of the compression ratio. (Author)

AD-640 258 **Field 17B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
USING UHF OF RADIO STATIONS FOR TRANSMITTING INFORMATION,
by P. P. Belogrivtsev. 25 Apr 66, 8p FTD-TT-65-1816
TT-66-62422
Unedited rough draft trans. of Vestnik Protivovozdushnoi Oborony (USSR) n4 p39-41 1964.

Descriptors: (*Radio communication systems, Ultrahigh frequency), USSR, Antennas, Radiofrequency amplifiers, Antenna components.

AD-640 319 **Field 17B, 20N**
CFSTI Prices: HC$1.00 MF$0.50
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
REVIEW OF THE EARTH MODE COMMUNICATION PROGRAM AT AFCRL.
Special repts.,
by Leon A. Ames, John W. Frazier, and Arnold S. Orange. Jul 66, 19p AFCRL-SR-48, AFCRL-66-481
Proj. AF-4600
Task 460011
Prepared in cooperation with Geoscience, Inc., Cambridge, Mass. Presented at the AGARD Symposium (12th) in Paris, France April 1966.

Descriptors: (*Communication systems, Underground), (*Propagation, Underground), Reviews, Underground antennas, Rock (Geology), Conductivity, Extremely low frequency, Magnetic fields, Electric fields.

The program in earth mode communications research at the U. S. Air Force Cambridge Research Laboratories is reviewed. Emphasis is placed on geological and geophysical problems encountered in the course of the program. Communications modes studied include: (1) 'deep-strata', wherein radio frequency electromagnetic waves are propagated between buried antennas over a path entirely within rock strata, and (2) 'conduction current', consisting of ULF conduction field communications between long, grounded dipoles. Deep-strata studies were carried out utilizing both loops and linear antennas immersed in the rock medium. Antenna and transmission path characteristics were studied under a variety of conditions and over paths up to 4.5 km in length. It was found that two of the greatest problems facing the communicator are the complexity of the earth's crust and its low values of electrical resistivity. Therefore, a geological and geophysical study was performed to evaluate possible transmission sites in the United States. Conduction field studies were performed using what was essentially the dipole-dipole geophysical resistivity sounding technique. Field tests were made at frequencies from 0.01 Hz to 10 Hz and at ranges to 32 km. (Author)

AD-640 378 **Field 17B, 20A**
CFSTI Prices: HC$1.00 MF$0.50
Naval Submarine Medical Center, Groton, Conn.
FREQUENCY SHIFTS OF A WHISTLE BLOWN IN DIFFERENT GASES.
Memorandum rept.,
by Russell L. Sergeant. 29 Sep 66, 7p MR-66-16
NAVMED-MF011.99-9001-07

Descriptors: (*Helium, Speech), (*Speech, Intelligibility), (*Underwater sound signals, Speech), Resonance, Frequency, Oxygen, Diving, Underwater sound, Underwater communication systems.

In a study of the resonating characteristics of a whistle in an effort to explain variations in voice quality observed in helium speech, it was found that the pure tone production of a whistle follows the same principles for frequency resonance as that found in the human voice. Different degrees

of upward shift in frequency occur for pure oxygen or a helium mixture. A taped signal does not change when played in helium-rich environment. Diffusion rates between gases appears to be important for minor shifts when the gas breathed is not the same as the environmental gas spoken into. Information presented in this report helps explains why helium speech, which is an important aspect of diving and underwater communications, sounds unusual. (Author)

AD-640 406 **Field 17B, 5G**
CFSTI Prices: HC$3.00 MF$0.50
Michigan Univ., Ann Arbor. Communication Sciences Lab.
STUDIES IN SPEECH ANALYSIS AND SYNTHESIS.
Final rept.,
by Gordon E. Peterson. Aug 66, 51p
Contract Nonr-1224 (22)
Proj. NR-049-122

Descriptors: (*Speech, Bibliographies), Analysis, Synthesis, Intelligibility, Speech recognition, Automation, Language, Spectroscopy, Information theory, Acoustic properties, Linguistics.

The report contains summaries of the journal articles and technical reports which have been published on a project with the Information Systems Branch of the Office of Naval Research on speech analysis and synthesis. Several of the investigations have included both theoretical and experimental studies. The subjects of investigation have included: techniques of spectrographic analysis, the recording and reproduction of speech signals with ferroelectric tapes, the automatic analysis of the information-bearing acoustical parameters of speech, the effects of certain of the acoustical parameters of speech on linguistic judgments, linguistic considerations in the measurement of speech intelligibility, aural processing of the speech wave, and techniques of speech synthesis. After a short introduction, the report presents a brief summary of each article and technical report published during the course of the research project. (Author)

N66-27943 **Field 17B, 22B**
CFSTI Prices HC$1.00 MF$0.50
Alaska Univ., College. Geophysical Inst.
ESTIMATED ABSORPTION OF 136 MC/S SATELLITE RADIO SIGNALS INTERIM TECHNICAL REPORT NO. 1.
by R. P. Basler, H. Leinbach, and L. Owren. Feb 62, 15p NASA-CR-75581
Contract NAS5-1413

Descriptors: *Auroral absorption, *Cosmic noise, *Polar cap, *Radio signal, *Sudden ionospheric disturbance (sid), Absorption, Angle, Attenuation, Aurora, Cap, Cosmic, Disturbance, Ionospheric, Polar, Radio, Satellite, Scattering, Signal, Sudden, Wave, Zenith, Zone.

For abstract, see S 04 15.

N66-27949 **Field 17B**
CFSTI Prices HC$7.00 MF$2.00
Raytheon Co., Sudbury, Mass. Space And Information Systems Div.
MILLIMETER COMMUNICATION PROPAGATION PROGRAM FIRST QUARTERLY REPORT, 1 NOV. 1964 - 1 FEB. 1965.
1966, 367p NASA-CR-75623, FR-65-40
Contract NAS5-9523

Descriptors: *Communication system, *Millimeter wave, *Propagation, *Space communication, Absorption, Antenna, Aperture, Bandwidth, Communication, Earth, Fading, Flat, Frequency, Measurement, Millimeter, Product, Signal, Space, System, Time, Wave, Waveform.

For abstract, see S 04 15.

N66-27952 **Field 17B**
CFSTI Prices HC$1.00 MF$0.50
Polytechnic Inst. Of Brooklyn, N. Y.
ANALYSIS OF AN F.M. DISCRIMINATOR WITH FADING SIGNAL PLUS ADDITIVE GAUSSIAN NOISE.
by K. K. Clarke, E. A. Nelson, and D. L. Schilling. 1965, 15p NASA-CR-75544
Contracts NGR-33-006-020, NSF GP-3112

Descriptors: *Discriminator, *Frequency modulation, *Gaussian noise, *Signal fading, Amplifier, Computation, Effect, Fading, Frequency, Gauss, Input, Modulation, Noise, Output, Ratio, Signal, Threshold, White.

For abstract, see S 04 15.

N66-27973 **Field 17B, 22B**
CFSTI Prices HC$1.00 MF$0.50
Comite Consultatif International De Radiocommunications, Geneva (Switzerland).
TECHNICAL FEASIBILITY OF DIRECT BROADCASTING FROM EARTH SATELLITES SHARING CONSIDERATIONS FOR BAND 7 AM BROADCASTING.
28 Oct 65, 15p IV/138, BC/53

Descriptors: *Amplitude modulation, *Radio communication, *Satellite transmission, Amplitude, Broadcasting, Communication, Direct, Frequency, Interference, Minimum, Modulation, Noise, Radio, Satellite, Sharing, Signal, Sky, Transmission, Wave.

For abstract, see S 04 15.

N66-28029 **Field 17B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
APOLLO UNIFIED S- BAND SYSTEM.
by K. E. Peltzer. Apr 66, 29p NASA-TM-X-55492, X-506-66-156
Presented At The 1965 Ieee Intern. Electron. Symp.

Descriptors: *Apollo project, *Radio communication, *S-band, *Telecommunication, Antenna, Communication, Function, Ground, Location, Operation, Radio, Ranging, Signal, Spacecraft, Station, System, Telemetry, Voice.

For abstract, see S 04 15.

N66-29303 **Field 17B**
CFSTI Prices HC$3.00 MF$0.75
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
INSTRUMENTATION FOR CONTINUOUS POLARIMETRY MEASUREMENTS OF SATELLITE TRANSMISSIONS SCIENTIFIC REPORT NO. 273.
by R. J. Sweet. 1 Jun 66, 65p NASA-CR-75849
Grant NSG-114-61

Descriptors: *Faraday rotation, *Ionosphere, *Measuring apparatus, *Polarimeter, *Satellite transmission, Antenna, Apparatus, Continuous, Fixed, Geometry, Linear, Measuring, Polarimetry, Polarization, Rotation, Satellite, System, Transmission, Wave.

For abstract, see S 04 16.

N66-29407 **Field 17B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
PRECISION MEASUREMENT OF LUNAR AND SOLAR RADIO EMISSION IN THE 4-MILLIMETER BAND.
Pretsizionnoye Izmereniye Radioizlucheniya Luny I Solntsa V 4-x Millimetrovom Dipazone Voln
by A. G. Kislyakov, and V. M. Plechkov. May 64, 10p NASA-TT-F-8874
Transl. Into English From Izv. Vyssh. Ucheb. Zaved., Radiofiz. (Gor'kiy), V. 7, No. 1, 1964 P 46-50

Descriptors: *Lunar disk, *Radio emission, *Sun, *Wavelength, Antenna, Brightness, Calibration, Difference, Disk, Emission, Lunar, Measurement, Output, Position, Precision, Radio, Radiometer, Signal, Soil, Telescope, Temperature.

For abstract, see S 04 16.

N66-29485 **Field 17B**
CFSTI Prices HC$6.00 MF$1.25
Raytheon Co., Sudbury, Mass. Space And Information Systems Div.
MILLIMETER COMMUNICATION PROPAGANDA PROGRAM SECOND QUARTERLY REPORT, 1 FEB. - 1 MAY 1965.
1965, 211p NASA-CR-67320, FR-65-186
Contract NAS5-9523

Descriptors: *Experiment design, *Millimeter wave, *Space communication, *Synchronous satellite, Analysis, Communication, Cost, Data, Design, Earth, Effect, Equipment, Estimate, Experiment, Facility, Ground, Medium, Millimeter, Orbital, Processing, Propagation, Satellite, Signal, Space, Synchronous, Wave.

For abstract, see S 04 16.

N66-36389 **Field 17B**
CFSTI Prices HC$1.00 MF$0.50
Purdue Univ., Lafayette, Ind. Electronic Systems Research Lab.
SOME EXPERIMENTAL RESULTS ON COMMUNICATION SYSTEMS SUBJECT TO INTERSYMBOL INTERFERENCE.
by C. C. Bailey. Jul 66, 15p NASA-CR-77944
Grant NSG-553
Its Mem. Rept.-66-1

Descriptors: *Digital communications system, *Electric network, *Interference, *Phase error, Bandwidth, Channel, Circuit, Communications, Correction, Correlation, Digital, Electric, Error, Network, Phase, System.

For abstract, see S 04 21.

AD-639 750 **See Field 5H**

AD-640 030 **See Field 9D**

AD-640 057 **See Field 15G**

AD-640 170 **See Field 5E**

AD-640 281 **See Field 9A**

AD-640 403 **See Field 9D**

PB-173 055 **See Field 17G**

PB-173 056 **See Field 17G**

PB-173 057 **See Field 17G**

PB-173 058 **See Field 17G**

PB-173 059 **See Field 17G**

PB-173 060 **See Field 17G**

17D. ELECTROMAGNETIC AND ACOUSTIC COUNTERMEASURES

AD-640 455 **Field 17D**
CFSTI Prices: HC$1.00 MF$0.50
Defense Systems Lab., Syracuse Univ. Research Corp., N. Y.
SEMI-ANNUAL PROGRESS REPORT, JANUARY 1, 1966-JUNE 30, 1966,

by Gordon H. LaTourette. 15 Jul 66, 21p DSL-R-148
Contract Nonr-4858 (00)
Proj. NR-259-056

Descriptors: (*Communication systems, Monitors), Radio receivers, Microwave equipment, Containers, Spectrum signatures, Spectrum analyzers, Electronic countermeasures, Teletype systems.

A number of operational improvements were made in the equipment containers used in the Modular Kit systems. The entire microwave receiver/display equipment (including all modifications recommended by DSL) used in the Modular Kit systems has been designated the Polarad Model TB-A. Two AN/URR-52A Panoramic Data Receiving Sets were received and are being checked out prior to installation in the Modular Kit systems. Further improvements have been made in the Birdie Oscillator circuitry used in the Frequency Demultiplexers for the Modular Kit systems. (Author)

17E. INFRARED AND ULTRAVIOLET DETECTION

AD-639 897 **Field 17E, 8G, 3B**
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
RAPID REMOTE SENSING BY A 'SPECTRUM MATCHING' TECHNIQUE. I. DESCRIPTION AND DISCUSSION OF THE METHOD.
Environmental research papers,
by Graham R. Hunt. 23 Feb 66, 16p AFCRL-ERP-214, AFCRL-66-546
Proj. AF-8602
Task 860201
Revision of manuscript submitted 27 Oct 65.
Availability: Published in Journal of Geophysical Research v71 n12 p2919-30 Jun 15 1966.

Descriptors: (*Infrared spectroscopy, Attenuators), Optical scanning, Targets, Rock (Geology).

A method of rapid remote sensing is described which is applicable for obtaining information about the compositions of materials from both terrestrial and extraterrestrial sources. It is a method of infrared spectrum matching, in which the emission spectrum from the source is instrumentally compared with the reflection spectra of a set of polished samples of different compositions. The effects of other variables, such as temperature and surface condition, are explored, and the effect of an intervening attenuator is considered. It is found that despite the presence of other variables identification of compositional differences between targets can be made. (Author)

17G. NAVIGATION AND GUIDANCE

AD-466 584 **Field 17G**
CFSTI Prices: HC$2.60 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
THE ACQUISITION OF SUN POINTING ATTITUDE BY SPACE VEHICLES WITHOUT THE USE OF RATE GYROSCOPES,
by J. K. Abbott. May 65, 25p Technical rept. TR-65097

Descriptors: (*Satellites (Artificial), Attitude control systems), (*Satellite attitude, Sun), Design, Mathematical analysis, Digital computers, Great Britain.

An attempt is made to define the initial conditions from which a sun pointing satellite with a simple 'on-off' jet control system is capable of acquiring attitude control. The control system was assumed to be stabilised by means of phase advance of the error signal rather than by the use of rate gyros. The study was carried out mainly by digital computation. The maximum initial angular velocity from which satisfactory acquisition performance could be achieved increased with increasing available angular acceleration and fell as the inertia configuration was made more unsymmetrical. The results are strictly applicable only to control systems of the type outlined above. Suggestions are made of alternative arrangements which might be worth study. (Author)

AD-468 936 **Field 17G, 1B**
CFSTI Prices: HC$1.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
AUTOMATIC INTERCEPT OF THE I.L.S. LOCALIZER,
by T. W. Prescott. Feb 65, 21p Technical rept. TR-65027

Descriptors: (*Instrument landings, Mathematical analysis), Automatic pilots, Air traffic control systems, Interception, Beam-rider trajectories, Performance (Engineering), Great Britain.

The problem of an aircraft making an automatic intercept of an I.L.S localizer has been further examined following a treatment of the subject in a report issued by Special Committee 79 of the Radio Technical Commission for Aeronautics (RTCA SC-79). An alternative method of calculating the minimum range at which intercept of the localizer must start is presented. This demands that the aircraft start the intercept at a greater range than with the method used in SC79, but the overshoot of the course line is only about one half of that previously allowed. This better beam joining performance is highly desirable for I.C.A.O. Category II operations and could be essential for Category III operation. (Author)

AD-479 129 **Field 17G, 1D**
CFSTI Prices: HC$2.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
PRELIMINARY REPORT ON THE USE OF SATELLITES TO NAVIGATE AIRCRAFT.
Technical memo.,
by R. H. Bauer, W. A. Bourgignon, and P. B. Ferriter. Jan 66, 41p TG-807
Contract NOw-62-0604

Descriptors: (*Aircraft, Radio navigation), (*Navigation satellites, Aircraft), Radio receivers, Radio equipment, Programming (Computers), Laboratories, Tests, Flight testing, Errors, Position finding, Instrumentation, Airborne, Doppler navigation, Doppler systems, Feasibility studies, Crystal oscillators, Photographic recording systems, Data, Inertial navigation, Circular error probable, All-weather aviation.

Identifiers: P-3 aircraft, AN/SRN-9.

The document reports results of a test program in which the Navy's navigational satellite system was technically evaluated as a prospective aid to aircraft navigation. The following conclusions are reached: (1) aircraft position can be accurately measured by the existing navigational satellite system; (2) an operational aircraft aid to navigation which used the navigational satellite system is possible without an extensive developmental effort; (3) position fix accuracy of an operational system would be superior to fix accuracies obtained in the test program; and (4) the navigation satellite system provides a means of world-wide, all-weather, high-accuracy aircraft navigation, passive on the part of the user and impractical to effectively jam. (Author)

AD-639 643 **Field 17G, 1E**
CFSTI Prices: HC$3.00 MF$0.75
Naval Research Lab., Washington, D. C.
AIRCRAFT LANDING APPROACH PATHS WITH THE RAINBOW OPTICAL LANDING SYSTEM,
by Barbour Lee Perry, and Patricia A. Griffin. 27 Jun 66, 59p NRL-6380
Proj. RR-006-09-41-5351

Descriptors: (*Glide path systems, Beacon lights), (*Landing aids, Carrier landings), Colors, Visual signals, Tables, Display systems, Mathematical analysis, Approach.

The Rainbow Optical Landing System is designed to present color-sequence-encoded sink-rate-error information to a pilot landing aboard a carrier. As the name implies, the Rainbow system utilizes a tricolor, dynamic light beam projected into the sky from a point near the landing spot. The approach path and associated sink rate of an aircraft whose pilot is flying the Rainbow system have been determined and plotted for several values of different system parameters. On the basis of these plots, optimal values of beam-pattern parameters can be selected. In addition, the effects on overall system performance of aircraft approach parameters such as initial error, initial range, and rate of approach to the carrier, can be displayed in the form of graphs and numerical tables. This analytical methodology can be readily applied to other systems which display higher-derivative-command signals. (Author)

AD-639 782 **Field 17G, 15A, 9B**
CFSTI Prices: HC$3.00 MF$0.75
National Engineering Science Co., Pasadena, Calif.
SYSTEMATIC TRACK RECONSTRUCTION (STR) COMPUTER PROGRAM.
Final rept.,
by Donald Stern, O. Wilson, Barbara S. Brawn, and James M. Chenoweth. Aug 66, 75p NESCO-SN-309-1
Contract N00014-66-C0084

Descriptors: (*Programming (Computers), *Tracking), (*Antisubmarine warfare, Tracking), (*Ships, Tracking), Submarines, Position finding, Navigation.

The present technique for resolving navigational conflicts involves 'eyeballing' the tracks, and guessing a possible solution. At best, this is not reproducible. The report describes a mathematically consistent method for obtaining the most probable estimate of actual positions from these conflicting records. Physically, the mathematics correspond to sliding the DRTs with respect to one another, rotating them, and stretching them so that a statistical compromise is obtained from the conflicting reports of ship position. As a compromise, therefore, reconstructed tracks may differ from actual ship movements. The computer program determines a confidence level for each reconstructed track which is a measure of the probability that the actual course differs from the reconstructed track. (Author)

AD-639 783 **Field 17G, 15A, 9B**
CFSTI Prices: HC$3.00 MF$0.75
National Engineering Science Co., Pasadena, Calif.
USERS' MANUAL FOR SYSTEMATIC TRACK RECONSTRUCTION (STR) COMPUTER PROGRAM,
by Barbara Brawn, Olin Wilson, and James M. Chenoweth. Aug 66, 84p NESCO-SN-309-2
Contract N00014-66-C0084
See also AD-639 782.

Descriptors: (*Programming (Computers), *Tracking), (*Antisubmarine warfare, Tracking), (*Ships, Tracking), Submarines, Instruction manuals, Position finding, Navigation.

The Systematic Track Reconstruction (STR) computer program was prepared as a part of the Fleet ASW Data Analysis Program (FADAP). It provides a means for resolving navigational conflicts which can arise from inconsistent data. Each unit involved in an ASW exercise records its position

on a Dead Reckoning Trace (DRT) and also its contacts with other ships. In the past, navigational conflicts have been resolved by 'eyeballing' the set of ship tracks. The report describes a mathematically consistent method for obtaining the most probable estimate of actual positions from these conflicting records. Physically, the mathematics correspond to sliding the DRTs with respect to one another, rotating them, and stretching them so that a statistical compromise is obtained from the conflicting reports of ship position. As a compromise, therefore, reconstruction tracks may differ from actual ship movements. The computer program determines a confidence level for each reconstructed track which is a measure of the probability that the actual course differs from the reconstructed track. (Author)

AD-640 013 **Field 17G**
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
DIFFERENTIAL OMEGA.
Memo. rept.,
by J. W. Brogden, and K. O. L. Luken. 8 Aug 66, 24p NRL-MR-1716
Proj. SS-161-001-6154

Descriptors: (*Radio navigation, Corrections), Propagation, Monitors, Radio signals, Phase measurement.

The differential Omega concept makes use of a control monitor to determine the difference between the received phase of the Omega signals and the computed or charted value. The difference noted by the control station, which is at a known location, is transmitted as a correction factor to the users in the field. This correction factor could also be based on a correction to the published skywave correction tables. Fixed monitors were established at this Laboratory in Washington, at the Chesapeake Bay Division at Chesapeake Beach, Maryland, and at the U. S. Coast Guard Electronic Engineering Center at Wildwood, New Jersey. The report is based on the data obtained at the start of the study. The results show that accuracies of one-half mile or better over a 24-hour period can be obtained at distances up to 100 miles from the control station. (Author)

N66-27065 **Field 17G**
CFSTI Prices HC$4.00 MF$1.00
General Electric Co., Johnson City, N. Y.
OPTICAL-INERTIA SPACE SEXTANT FOR AN ADVANCED SPACE NAVIGATION SYSTEM, PHASE B.
by G. F. Auclair, R. M. Derby, W. D. Foley, and J. J. Wilczynski. Jun 66, 126p NASA-CR-498
Contract NAS2-1087

Descriptors: *Inertial measuring unit, *Navigation system, *Sextant, Data, Inertial, Measuring, Mode, Navigation, Noise, Optical, Processing, Scanning, Slew, Space, Star, System, Television, Tracker, Unit.

For abstract, see S 04 15.

N66-27324 **Field 17G**
CFSTI Prices HC$5.00 MF$1.00
Space-general Corp., El Monte, Calif.
FINE ATTITUDE CONTROL SYSTEM, VOLUME I FINAL REPORT.
Jul 65, 158p NASA-CR-75392, SGC-742R-8, VOL. I
Contract NAS5-9056

Descriptors: *Aerobee rocket, *Attitude control, *Guidance system, Attitude, Bearing, Breadboard, Control, Gas, Guidance, Gyro, Inertial, Optical, Sensor, Simulator, System.

For abstract, see S 04 15.

N66-27325 **Field 17G**
CFSTI Prices HC$6.00 MF$1.50
Space-general Corp., El Monte, Calif.
FINE ATTITUDE CONTROL SYSTEM, VOLUME II FINAL REPORT.
Jul 65, 286p NASA-CR-75393, SGC-742R-8, VOL. II
Contract NAS5-9056

Descriptors: *Aerobee rocket, *Attitude control, *Guidance system, Attitude, Breadboard, Calibration, Control, Force, Gimbal, Guidance, Maneuver, Module, Pneumatic, Ramp, Roll, Subassembly, System, Telemetry, Torque.

For abstract, see S 04 15.

N66-28752 **Field 17G**
CFSTI Prices HC$6.00 MF$1.25
Massachusetts Inst. Of Tech., Cambridge. Instrumentation Lab.
SPACE NAVIGATION GUIDANCE AND CONTROL, VOLUME I.
Jun 65, 233p NASA-CR-75543, R-500, VOL. 1
Contract NAS9-4065

Descriptors: *Apollo project, *Lunar landing, *Manned space flight, *Navigation and guidance, Computation, Flight, Guidance, Instrumentation, Landing, Lunar, Manned, Mission, Navigation, Onboard, Problem, Safety, Space, System.

For abstract, see S 04 16.

N66-28759 **Field 17G**
CFSTI Prices HC$6.00 MF$1.50
Massachusetts Inst. Of Tech., Cambridge. Instrumentation Lab.
SPACE NAVIGATION GUIDANCE AND CONTROL, VOLUME 2.
Jun 65, 271p NASA-CR-75798, R-500, VOL. 2
Contract NAS9-4065

Descriptors: *Apollo spacecraft, *Attitude control, *Computer design, *Inertial measuring unit, *Navigation and guidance, *Optical measurement, Attitude, Control, Guidance, Inertial, Measurement, Measuring, Navigation, Optical, Pulse, Space vehicle, Spacecraft, System, Torque, Unit.

For abstract, see S 04 16.

N66-29217 **Field 17G**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
THE HIGHLY COUPLED SYSTEM - A GENERAL APPROACH TO THE PASSIVE ATTITUDE STABILIZATION OF SPACE VEHICLES.
by V. K. Merrick, and F. J. Moran. Jul 66, 29p NASA-TN-D-3480
Presented At 3d Congr. Of Intern. Federation Of Autom. Control, London, Jun. 1966

Descriptors: *Attitude control, *Degree of freedom, *Inertia, *Mass distribution, *Space vehicle, *Stability and control, Ambient, Attitude, Control, Coupling, Degree, Distribution, Electromagnetic, Field, Force, Freedom, Gravitation, Mass, Passive, Stability, Stabilization.

For abstract, see S 04 16.

N66-29289 **Field 17G**
CFSTI Prices HC$6.00 MF$1.25
General Dynamics/convair, San Diego, Calif.
FEASIBILITY STUDY AND DESIGN CONCEPT FOR THE COMPUTER-CONTROLLED LAUNCH SET.
30 Aug 65, 211p NASA-CR-72007, GD/C-BTD-65-127
Contract NAS3-3232

Descriptors: *Centaur launch vehicle, *Checkout equipment, *Computer design, *Launching device, Checkout, Communication, Computer, Data, Design, Device, Digital, Engine, Equipment, Feasibility, Gimbal, Launch vehicle, Launching, Monitor, Processing, Test.

For abstract, see S 04 16.

N66-29391 **Field 17G**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
SOME NOTES ON METHODS OF ASSESSING VERTICAL SEPARATION STANDARDS.
by W. Gracey. 1965, 17p NASA-TM-X-56784
Presented At The 12th Alpa Air Safety Forum Of The Air Line Pilots Assoc., Des Plaines, Ill., 5-6 Oct. 1965

Descriptors: *Commercial aircraft, *Error, *Flight altitude, Aircraft, Altitude, Autopilot, Collision, Commercial, Control, Flight, Pressure, Probability, Separation, Standard, Static, Turbojet, Turboprop, Vertical.

For abstract, see S 04 16.

N66-35649 **Field 17G**
CFSTI Prices HC$6.00 MF$1.25
Honeywell, Inc., St. Paul, Minn.
DATA REQUIREMENTS FOR IN-FLIGHT SYNTHESIS AND MULTIPLE BLENDER STUDIES.
by L. D. Edinger, and G. D. White. Aug 66, 227p NASA-CR-548
Contract NAS8-11206

Descriptors: *Control system, *Engine control, *Flexible body, *Flight control, *Stability and control, Bending, Blend, Body, Booster, Control, Data, Engine, Flexible, Flight, Large, Mode, Multiple, Requirement, Stability, Synthesis, System.

For abstract, see S 04 21.

N66-36118 **Field 17G**
CFSTI Prices HC$2.50 MF$0.75
Environmental Science Services Administration, Washington, D. C.
NAVY SATELLITE NAVIGATION SYSTEM.
by F. G. Paulsen. Sep 66, 85p NASA-CR-612
Sponsored By Nasa And Dept. Of Defense

Descriptors: *Navigation system, *Positioning, *Transit satellite, Accuracy, Application, Civil, Equipment, Fix, Navigation, Orbit, Satellite, Ship, Survey, System, Tracking, Transit.

For abstract, see S 04 21.

N66-36300 **Field 17G**
CFSTI Prices HC$2.50 MF$0.75
Westinghouse Electric Corp., Baltimore, Md.
ATTITUDE DETERMINATION BY KALMAN FILTERING, VOLUME I.
by J. L. Farrell. Sep 64, 90p NASA-CR-598
Contract NAS5-9195

Descriptors: *Attitude, *Kalman-schmidt filter, *Monte carlo method, *Simulation, Dynamics, Filter, Linear, Magnetic, Rotation, Sampling, Satellite, Solar, Spin.

For abstract, see S 04 21.

N66-36301 **Field 17G**
CFSTI Prices HC$2.50 MF$0.75
Westinghouse Electric Corp., Baltimore, Md.
ATTITUDE DETERMINATION USING A KALMAN FILTER, VOLUME II.
by J. L. Farrell. Sep 66, 77p NASA-CR-599
Contract NAS5-9195

Descriptors: *Computer program, *Kalman-schmidt filter, *Orbiting satellite, *Satellite attitude control, Attitude, Computer, Control,

Fortran, Monte carlo method, Orbit, Program, Satellite, Vehicle.

For abstract, see S 04 21.

PB-172 894 **Field 17G, 1E**
CFSTI Prices: HC$1.00 MF$0.50
Airborne Instruments Lab., Deer Park, N. Y.
OFFSET MARKER BEACON ANTENNA.
Final rept.,
by George Skahill. Feb 66, 25p
Contract FA-WA-4523
Proj. SRDS-320-101-IN
SRDS-RD-65-88

Descriptors: (*Radio beacons, *Antenna configurations), (*Yagi antennas, Radio beacons), Instrument landings, Antenna radiation patterns, Navigation aids, Design, Construction, Tests, Performance (Engineering).

Identifiers: Offset marker beacons.

A broadside array of Yagi antennas was developed to supply radiation characteristics suitable for proper Marker Beacon performance for offset distances up to one mile. The design criteria, construction, tests, and installation requirements are described. (Author)

PB-173 055 **Field 17G, 17B**
CFSTI Prices: HC$4.00 MF$0.75
Communication Systems, Inc., Paramus, N. J.
FUTURE AIR-GROUND-AIR COMMUNICATION SUBSYSTEM INVESTIGATION. PART A. INTRODUCTION. PART F. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS. VOLUME I.
Final rept., Vol-1.
Jul 66, 106p CSI-66-TR-2144
Contract FA-WA-4645
SRDS-RD-66-16-Vol-1

Descriptors: (*Air traffic control systems, *Communication systems), Air traffic, Air traffic control terminal areas, Computers, Systems engineering.

A sample of air and communication traffic data was taken from normally busy terminal and enroute controller positions in the FAA Eastern Region during selected heavy traffic periods. The raw data, taken from flight strips and communication tapes, was reduced using a computer program developed for the purpose. An analysis identified significant relationships between air traffic and communication traffic. The impact on communication traffic of other ATC environmental factors was also studied. Based on this analysis and on best available predictions of the future ATC environment and air traffic, post 1972 A/G/A communication traffic demands were projected. A communication subsystem capable of supporting this traffic and satisfying other requirements of future ATC A/G/A communications was synthesized. The necessary hardware is within the state of the art, but for the most part still requires development. A feasible, phased implementation plan for the development and introduction of the future subsystem is presented, together with preliminary budgetary cost estimates for the program. (Author)

PB-173 056 **Field 17G, 17B**
CFSTI Prices: HC$7.00 MF$1.75
Communication Systems, Inc., Paramus, N. J.
FUTURE AIR-GROUND-AIR COMMUNICATION SUBSYSTEM INVESTIGATION. PART B. CHARACTERIZATION OF THE PRESENT ATC A/G/A COMMUNICATION SUBSYSTEM AND ITS ENVIRONMENT. VOLUME II. SECTIONS 1.0 THRU 5, 3, 4.
Final rept., Vol-2.
Jul 66, 361p CSI-66-TR-2145
Contract FA-WA-4645
SRDS-RD-66-16-Vol-2
See also PB-173 055.

Descriptors: (*Air traffic control systems, *Communication systems), Air traffic, Air traffic control terminal areas, Human engineering.

Contents: ATC procedures and flight rules; Qualitative characterization of present A/G/A communication subsystem; Quantitative characterization of present center A/G/A communications subsystem.

PB-173 057 **Field 17G, 17B**
CFSTI Prices: HC$7.00 MF$1.75
Communication Systems, Inc., Paramus, N. J.
FUTURE AIR-GROUND-AIR COMMUNICATION SUBSYSTEM INVESTIGATION. PART B. CHARACTERIZATION OF THE PRESENT ATC A/G/A COMMUNICATION SUBSYSTEM AND ITS ENVIRONMENT. VOLUME III.
Final rept., Vol-3.
Jul 66, 342p CSI-66-TR-2146
Contract FA-WA-4645.
SRDS-RD-66-16-Vol-3
See also PB-173 056.

Descriptors: (*Air traffic control systems, *Communication systems), Air traffic, Air traffic control terminal areas, Performance (Engineering).

Contents: Quantitative characterization of present center A/G/A communications subsystem; Quantitative characterization of present terminal area A/G/A communication subsystem; Communication traffic flow and performance.

PB-173 058 **Field 17G, 17B**
CFSTI Prices: HC$7.00 MF$1.50
Communication Systems, Inc. Paramus, N. J.
FUTURE AIR-GROUND-AIR COMMUNICATION SUBSYSTEM INVESTIGATION. PARTS C, D, E, G, H. VOLUME IV.
Final rept., Vol-4.
Jul 66, 315p CSI-66-TR-2147
Contract FA-WA-4645
SRDS-RD-66-16-Vol-4
See also PB-173 057.

Descriptors: (*Air traffic control systems, *Communication systems), Air traffic, Air traffic control terminal areas, Air traffic controllers, Design, Simulation.

Contents: Air/ground/air communications requirements for the 1970/75 time period; Study and design synthesis of an A/G/A communication subsystem design; Simulation modeling investigation; References and bibliography; Glossary of terms.

PB-173 059 **Field 17G, 17B**
CFSTI Prices: HC$6.00 MF$1.25
Communication Systems, Inc., Paramus, N. J.
FUTURE AIR-GROUND-AIR COMMUNICATION SUBSYSTEM INVESTIGATION. PART J. APPENDICES I THRU IV. VOLUME V.
Final rept.-Vol-5.
Jul 66, 259p CSI-66-TR-2148
Contract FA-WA-4645
SRDS-RD-66-16-Vol-5
See also PB-173 058.

Descriptors: (*Air traffic control systems, *Communication systems), Air traffic, Air traffic control terminal areas, Programming (Computers), Statistical analysis.

Contents: Identification of parameters of A/G/A communication subsystem and its operating environment; Data gathering experiments; Computer program document for air traffic/communication traffic statistical analysis; Preliminary statistical data on air and communication traffic.

PB-173 060 **Field 17G, 17B**
CFSTI Prices: HC$6.00 MF$1.25
Communication Systems, Inc., Paramus, N. J.
FUTURE AIR-GROUND-AIR COMMUNICATION SUBSYSTEM INVESTIGATION. PART J. APPENDICES V THRU XIV. VOLUME VI.
Final rept., Vol-6.
Jul 66, 241p CSI-66-TR-2149
Contract FA-WA-4645
SRDS-RD-66-16-Vol-6
See also PB-173 059.

Descriptors: (*Air traffic control systems, *Communication systems), Air traffic, Air traffic control terminal areas, Mathematical models, Aircraft, High altitude, Systems engineering.

Contents: A mathematical model of channel utilization in terms of single aircraft parameters in low altitude airspace; A mathematical model of channel utilization in terms of single aircraft parameters in high-altitude sectors; Data tabulations, single aircraft positions; Data summary, one-hour time slices, terminal; Recomputation of confidence intervals; Air traffic projections, 1970-75; Derivation of relationships for Q and M sub r; Prediction of 1970-75 hourly conditional channel demand q sub c for center and terminal; Calculations of changes in channel demand due to ATC factors impacting on communications; Techniques for possible application in the synthesis of an optimum ATC A/G/A communication subsystem.

AD-639 692 **See Field 22C**

AD-640 430 **See Field 9C**

17H. OPTICAL DETECTION

AD-639 725 **Field 17H, 22B**
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
PHOTOELECTRIC PHOTOMETRY - A POTENTIAL SOURCE FOR SATELLITE SIGNATURES,
by Kenneth E. Kissell, and Richard C. Vanderburgh. 1966, 35p ARL-66-0162
Proj. AF-7114
Prepared in cooperation with Ohio State Univ. Research Foundation, Columbus.
Availability: Published in unidentified Journal.

Descriptors: (*Satellites (Artificial), *Spectrum signatures), (*Photometers, Satellites (Artificial)), Photoelectric effect, Spacecraft, Brightness, USSR, Albedo, Scattering, Spheres, Cylindrical bodies, Orbital trajectories, Space surveillance systems.

The experience gained since 1962 in the photoelectric measurement of space vehicle brightness is outlined and the methods used to collect signature data on vehicles of brightness +11 stellar magnitudes (1/50 sq. m diffuse scatterer at 1000 km) or greater are described. Examples of light curves are given, and a model of a tumbling, diffusely scattering cylinder is developed and compared with a USSR rocket body. A model of a specularly scattering sphere is compared with data collected from three USSR vehicles whose orbital lifetimes indicated their being of deorbiting character. It is shown that these techniques offer a relatively low-cost method of collecting optical signature data at ranges much exceeding those at which resolved images could be obtained. The bistatic and CW character of the technique is demonstrated, which, combined with its inherent inverse-square law limitation on slant range, suggests it as a valuable supplement to conventional radar techniques and long focus imaging. A comprehensive historical account of prior work in satellite photometry is appended. (Author)

N66-29078 **Field 17H**
CFSTI Prices HC$5.00 MF$1.00
Electro-optical Systems, Inc., Pasadena, Calif.
SOLAR REFLECTING BEACON FINAL REPORT, 16 JUN. 1965 - 16 APR. 1966.
by G. A. Jelley, B. E. Kalensher, and D. E. Stewart. 16 Jun 66, 176p NASA-CR-65403, EOS-6976-FINAL.
Contract NAS9-4790

Descriptors: *Beacon, *Lunar excursion module (lem), *Navigation aid, *Solar reflector,

*Systems design, Aid, Astronaut, Concept, Descent, Design, Earth, Engineering, Excursion, Landing, Lem, Lunar, Module, Navigation, Reflection, Reflector, Solar, System, Visible.

For abstract, see S 04 16.

AD-640 003 **See Field 4A**

PB-170 901 **See Field 20E**

17I. RADAR DETECTION

AD-639 707 **Field 17I**
CFSTI Prices: HC$5.00 MF$1.00
Virginia Univ., Charlottesville. Industrial Research and Development Center.
INVESTIGATION OF THE POWER SPECTRUM PRODUCED BY THE LINEAR MIXING OF FREQUENCY MODULATED SIGNALS.
Final rept.,
by G. A. McAlpine, J. C. Isaacs, and C. M. Weant. Sep 66, 159p IRDC-3358-111-66U
Contract DA-49-186-AMC-315 (D)
Proj. 26524

Descriptors: (*Radar signals, Frequency modulation), Radiofrequency power, Approximation (Mathematics), Theorems, Integral transforms, Programming (Computers), Analysis.

A generalized approach to the spectrum analysis of randomly frequency modulated signals is presented and indicates the need for approximate methods and knowledge of their expected accuracy. Sufficient conditions are established for the applicability of Woodward's (adiabatic) Theorem for large modulation index fm spectra and an upper bound is given for the spectral error committed in using the approximation for sinusoidal and/or Gaussian random modulation. The approximate spectra are compared with computed spectra for ideal low pass, ideal band pass and sinusoidal plus ideal band pass Gaussian modulation. The computer programs employed are described. Also given is a development of an approximate expression for the spectra of a sinusoid with random phase switching which is compared to results obtained by making some simplifying assumptions and employing an equation given in Lawson and Uhlenbeck, M.I.T. Radiation Laboratories Series, Vol. 24, pg. 45. (Author)

AD-639 920 **Field 17I, 12A**
CFSTI Prices: HC$1.00 MF$0.50
Naval Postgraduate School, Monterey, Calif.
APPLICATION OF THE KALMAN FILTER TO SPHERICAL DISCRETE TRACK SMOOTHING AND PREDICTION.
Technical rept. research paper,
by J. S. Demetry, and R. E. Hudson. 1 Sep 66, 23p TR/RP-70

Descriptors: (*Radar tracking, Mathematical prediction), Transformations (Mathematics), Linear systems, Functional analysis, Stability.

Identifiers: Kalman filter.

The paper investigates the effectiveness of a method for circumventing the problem of nonlinear observation of a linear system's state variables in the Kalman filter discrete estimation scheme. The method employs a linearization of the nonlinear coordinate transformation, in this case cartesian to spherical. The performance of a filter designed by this method is observed as a function of measurement error, accuracy of filter initialization, and the relevance of the estimated initial error covariance, P sub 2/1. The investigation reveals that the most critical factor in filter performance and stability is filter state initialization. (Author)

AD-640 027 **Field 17I**
CFSTI Prices: HC$2.00 MF$0.50
Naval Research Lab., Washington, D. C.
AIRBORNE SENSORS.
Memo. rept.,
by O. D. Sledge. 16 Sep 66, 29p NRL-MR-1717

Descriptors: (*Target acquisition, Multiple operation), Radiometers, Radar, Airborne, Microwaves, Radar antennas, Radar reflections, Performance (Engineering), Terrain, Radiofrequency power.

Formulas are developed for the response of an airborne radiometer to the microwave radiation from the atmosphere and the terrain. Corresponding formulas are derived for the response of an airborne radar antenna to the radar return from the earth in the narrow frequency range of operation of the radiometer. Both diffuse and specular areas of the terrain are considered in the theoretical treatments. When operating over the same isothermal diffuse surface of the earth, the theory shows that the deviation of the power output of the radiometer antenna from its time average value is linearly proportional to the negative of the deviation of the radar antenna output from its mean value, provided the relative gain of the radiometer antenna is the square of the relative gain of the radar antenna. Using the developed formulas, the power response of the microwave radiometer and radar are calculated for a simple earth model. The results of the calculations show that the two sensors, using antennas of identical radiation properties, have complementary characteristics. (Author)

AD-640 059 **Field 17I**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
AN APPRAISAL OF THE VJ REMOTE RADAR INDICATOR,
by A. Chapanis. 20 May 49, 5p
SPECDEVCEN-166-1-58

Descriptors: (*Radar equipment, Effectiveness), Radar operators, Errors, Plan position indicators, Range finding, Position finding.

In comparison with other radars which were studied, the VJ is more accurate than the SG, about as accurate as the VG, and much less accurate than the VF. (Author)

AD-640 061 **Field 17I, 5H, 5J**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Baltimore, Md.
MANEUVERABLE TARGET POSITIONING UNIT,
by Howard Head. 4 Mar 49, 23p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-73

Descriptors: (*Radar target position simulators, *Display systems), Effectiveness, Maneuverability.

One phase of psychological research into the effectiveness of various radar display equipment calls for laboratory simulation at the radar indicator of conditions which exist when a friendly aircraft is maneuvered in accordance with instructions from the radar observer. A Maneuverable Target Positioning Unit was developed to fulfill this requirement. The machine drives one point (maneuverable aircraft) with respect to another (radar observer), and provides controls for speed and course as selected by the operator. These motions are used to position the shafts of range and bearing potentiometers. The potentiometers control the output of a separate target generating system which, in turn, produces the maneuverable target on the radar indicator under consideration. One unit is complete and two additional units are under construction. Preliminary tests show satisfactory performance and indicate that the machine may be expected to function as intended in the projected research program. (Author)

AD-640 071 **Field 17I, 5I**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Baltimore, Md. Engineering Lab.
AUTOMATIC TARGET POSITIONING UNIT, MODEL 1.
Technical rept.,
by Edmund W. Schiemer. 17 Jan 51, 11p
Contract N5ori-166 (01)
Projs. NR-784-001, SDC-20-F-1
SPECDEVCEN-166-1-75
Reprinted 1 May 1952.

Descriptors: (*Radar target position simulators, Automatic), Potentiometers, Direction finding, Range finding.

Identifiers: TGS-1.

Tests made on the Automatic Target Positioning Unit, Model 1 proved that it is capable of reproducing an hour-long course with accuracies of better than 0.02 per cent of full scale on range and plus or minus 0.1 degree on bearing when operated in conjunction with the TGS-1 Target Generating System. (Author)

AD-640 072 **Field 17I, 5I**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Baltimore, Md. Engineering Lab.
TARGET GENERATING SYSTEM, TGS-1.
Technical rept.,
by Dale M. Barger. 20 Jun 49, 57p
SPECDEVCEN-166-1-76
Reprinted Jan 1954.

Descriptors: (*Radar target position simulators, Design), Display systems, Antenna simulators, Cathode ray tube screens, Circuits.

Identifiers: TGS-1.

The report describes a target generating system designed as a research instrument. In the study of psychological problems connected with radar design and operation, the radar display furnishes the principal experimental variable by means of which various equipments and operational methods may be compared and evaluated. For effective experimentation, precise control of all aspects of the display is desirable. (Author)

AD-640 075 **Field 17I, 5E, 5H**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
SIMULATED DISPLAY OF BEARING AND RANGE IN RECTANGULAR COORDINATES.
Technical rept.,
by J. W. Gebhard, J. L. Barber, and R. M. Halsey. 1 May 49, 14p
Contract N5ori-166 (01)
Proj. NR-784-001
SPECDEVCEN-166-1-81

Descriptors: (*Radar target position simulators, *Display systems), Direction finding, Range finding, Plan position indicators, Human engineering.

Several experiments were conducted to determine the speed and accuracy with which target position can be read from an experimental display of radar bearing and range information in rectangular coordinates in which 360 degrees of bearing were given on the x-axis and 40,000 yards of range were shown on the y-axis. A rectangular scope, produced by modifying a VD radar indicator, was first compared with a PPI with respect to accuracy of aligning a movable range marker with blips. The rectangular display was found to produce smaller alignment errors than the PPI, and to be free from the effect, present in PPIs, of greater error with longer ranges. The factor of target length had no effect on accuracy for the experimental display whereas on the PPI arc length interacts strongly with target range in determining alignment error. Several bearing grids were tested on a simulated

rectangular display for the purpose of selecting the most suitable design. Bearing scales marked in intervals of 20 degrees were found superior to those marked in intervals of 30 degrees as measured by speed of reading and bearing error when visual estimations of target position were made. Size of display had no effect on either speed or accuracy, nor did different starting points of the bearing scale. It is concluded that a rectangular display is as efficient as, and in some respects superior to, a PPI for estimating target position. Its adaptability for displaying information for tactical evaluation is questionable due to the presence of distortion. (Author)

AD-640 079 **Field 17I, 5E**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
GEAR-RATIOS FOR CURSORS OF PPI'S.
Technical rept.,
by R. A. McCleary, and C. T. Morgan. 10 Jun 49, 10p
Contract N5ori-166 (01)
Projs. NR-784-001, SDC-20-F-1
SPECDEVCEN-166-1-96

Descriptors: (*Plan position indicators, Human engineering), Hand cranks, Radar operators, Radar equipment, Gears.

There is an optimum gear-ratio for operating a remote PPI. The optimum, however, depends upon a number of factors--the most important of which is the angular distance through which the cursor must be moved to get it on the pip. If the distance is very short, say, 15 degrees, the optimum is high--in the neighborhood of 20 revolutions of the crank for one revolution of the cursor. If the distance is longer, say, 165 degrees, the optimum is much smaller--about 5:1. If one averages all distances likely to be encountered in normal operation of PPI's, the optimum is still about 5:1. This, therefore, is the recommended ratio for typical radar operation. (Author)

AD-640 080 **Field 17I, 5E**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
EFFECT OF THE REFLECTION PLOTTER ON THE VISIBILITY OF SIGNALS ON PPI SCREENS.
Technical rept.,
by J. W. Gebhard, and G. H. Mowbray. 10 Dec 50, 8p
Contract N5ori-166 (01)
Projs. NR-784-001, SDC-20-F-1
SPECDEVCEN-166-1-119

Descriptors: (*Radar signals, Visibility), (*Radar reflections, Plotters), Plan position indicators, Illumination, Viewing screens.

Measurements were made to determine the effect of the Reflection Plotter on the visibility of simulated radar signals on PPI screens. Three sizes of target were viewed at 12 inches on a CRT with a P-7 phosphor. These were: small (1 microsec X 1 deg), medium (3 microsec X 10 deg) and large (10 microsec X 30 deg). The data were obtained by the method of attenuating an eight volt signal until a just visible signal was discerned. This measure was expressed in decibels attenuation and was found at screen luminances corresponding to 2, 5.5, 8 and 10 volts of CRT bias beyond visual cutoff for the tube. No noise was used in the tests. Four conditions of visibility were investigated: (1) No Reflection Plotter. (2) Clean Reflection Plotter without edge lighting. (3) Clean Reflection Plotter with faint edge lighting. (4) Dirty Reflection Plotter with bright edge lighting. The results show that the clean Reflection Plotter (condition 2) produced about three db of loss in signal visibility over the condition where no Plotter was used. A brightly lighted Plotter whose surface has been used and wiped to smear the residue of old grease pencil marks (condition 4) produced a seven db loss over the condition where no Plotter was used. (Author)

AD-640 082 **Field 17I, 5J**
CFSTI Prices: HC$2.00 MF$0.50
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
SOME EXPERIMENTS WITH THE VF AIDED TRACKING EQUIPMENT,
by J. W. Gebhard. 15 Sep 48, 34p
SPECDEVCEN-166-1-53

Descriptors: (*Radar tracking, Performance (Human)), Radar equipment, Direction finding, Range finding, Errors, Radar operators.

Three experiments were performed to compare mechanically aided and manual tracking on the B-scope of the VF indicator. The first experiment measured bearing and range accuracy of continued tracking after the operator had centered the B-scope presentation on the target and determined its course and speed. The second experiment measured bearing and range accuracy of reestablished contact after simulated fades of two and four scans. The third experiment measured bearing and range accuracy during initial tracking adjustments on a target whose movement pattern was not yet established.

AD-640 144 **Field 17I**
CFSTI Prices: HC$1.00 MF$0.50
Texas Univ., Austin. Antennas and Propagation Div.
A NOTE ON THE IDEALIZED RADAR RANGE EQUATION,
by J. J. Stephens. 11 May 66, 11p Rept. no. P-5
Contract DA-49-092-ARO-87

Descriptors: (*Meteorological radar, Ranges (Distance)), Approximation (Mathematics), Integration, Special functions (Mathematical).

A complete statement of the idealized radar range equation is shown and compared to the result given by Probert-Jones. (Author)

AD-640 262 **Field 17I, 20E**
CFSTI Prices: HC$1.00 MF$0.50
Naval Ordnance Lab., Corona, Calif.
RADAR HOLOGRAMS,
by Robert L. Conger, Leslie T. Long, and John A. Parks. 30 Sep 66, 21p NOLC-677
Task R360-FR-104/211-1/R011-01-01

Descriptors: (*Radar equipment, *Display systems), (*Stereoscopic display systems, Radar equipment), (*Lasers, Stereoscopic display systems), Optical images, Radar signals, Photographic images, Diffraction, Integrals, Interferometers.

Identifiers: Fraunhofer diffraction images, Holography.

Optical experiments and mathematical analysis of radar patterns have shown that radar holograms which are not affected by vibration can be obtained by the following method: (1) A scanning radar receiver--possibly airborne--or an array of such receivers is used to produce a map that shows the intensities of radar signals; (2) a pattern of concentric black and white bands is developed--possibly by a computer--in which the width of each band is proportional to the cube root of its respective radar signal intensity; (3) the photographically reduced pattern is made into a transparency which is the hologram; and (4) the hologram is illuminated by coherent light to provide images of the objects that caused the original radar signal distribution. This method produces holograms which are superior to Fresnel holograms, in that vibration is not a factor and, because exact gray scales are not required, to Fraunhofer holograms. (Author)

AD-640 324 **Field 17I**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
SECTOR DISPLAY SCOPE USING A FLAT CATHODE-RAY TUBE,
by V. N. Vetlinskii. 18 Apr 66, 7p FTD-TT-65-997
Unedited rough draft trans. of Patent (USSR) 156191, appl. 794 751/26-9, 14 Sep 62.

Descriptors: (*Display systems, Radar equipment), USSR, Cathode ray tubes, Delay lines, Wedges, Patents.

The object of the invention is a sector display scope (indicator of sector survey) using a flat cathode-ray tube with a device for obtaining distance scanning. To increase the speed of the scanning and improve the resolving capacity of the indicator an electromagnetic retardation line is used the lead-outs of which are connected up to metallic bands on the surface of a flat cathode-ray tube. (Author)

N66-36056 **Field 17I**
CFSTI Prices HC$1.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge. Electronic Systems Lab.
R- F SIMULATOR FOR A LONG-PULSE RADAR.
by E. L. Arnn Jr. Jun 66, 14p NASA-CR-77798, ESL-TM-273
Grant NSG-234-61

Descriptors: *Radar echo, *Target simulation, *X-band, Band, Design, Echo, Frequency, Output, Power, Purity, Radar, Simulation, Spectrum, Stability, Target.

For abstract, see S 04 21.

N66-36083 **Field 17I**
CFSTI Prices HC$2.00 MF$0.50
Kansas Univ., Lawrence. Center For Research In Engineering Science.
RADAR SCATTEROMETRY - AN ACTIVE REMOTE SENSING TOOL.
by R. K. Moore. 1966, 41p NASA-CR-77756, CRES-61-11
Contract NSR-17-004-003
Presented At The 4th Symp. On Remote Sensing Of The Environment, Ann Arbor, Mich., 11-14 Apr. 1966

Descriptors: *Radar scattering, *Scattering coefficient, Angle, Coefficient, Measurement, Polarization, Radar, Range, Remote, Scattering, Sensing, System, Variation, Wavelength.

For abstract, see S 04 21.

PB-173 020 **Field 17I, 9D**
CFSTI Prices: HC$13.60 MF$1.00
Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
ANALYSIS OF A WIDEBAND RANDOM SIGNAL RADAR SYSTEM.
by G. R. Cooper, and R. L. Gassner. Aug 66, 135p TR-EE66-9
Grant NSF-GK-189

Descriptors: (*Radar signals, Broadband), Noise (Radar), Radar receivers, Digital systems, Coincidence range finding, Correlators, Video signals, Polarization, Radiofrequency filters, Low-pass filters, Band-pass filters, Analog systems, Integrators.

Identifiers: Random-signal radar.

Research was undertaken to determine the properties of a radar system using as a transmitted signal a Gaussian narrow-band random signal (most likely obtained by amplifying some noise source) and employing as a receiver a digital polarity coincidence correlator in a configuration which provides an estimate of the envelope of the crosscorrelation function of the transmitted and received signals. The analysis was: (1) the performance of the (video) digital polarity coincidence correlator itself; (2) an analysis of configurations making use

of this correlator to estimate the envelope of the crosscorrelation function of microwave signals; (3) the modifications required to make the correlator suitable for the radar application; (4) the performance in noise of the random signal radar system; and (5) the resolution capability of the random signal radar system.

AD-639 627 See Field 5J

AD-639 790 See Field 8G

AD-639 855 See Field 5J

AD-640 238 See Field 22C

17J. SEISMIC DETECTION

AD-640 212 Field 17J, 8K
CFSTI Prices: HC$4.00 MF$0.75
Michigan Univ., Ann Arbor. Inst. of Science and Technology.
COLLECTION AND ANALYSIS OF SEISMIC WAVE PROPAGATION DATA.
Final rept.,
by David E. Willis, and Philip L. Jackson. Aug 66, 103p 5178-64-F
Contract AF 49 (638)-1170, ARPA Order-292-62
Proj. AF-8100

Descriptors: (*Seismic waves, Propagation), Seismographs, Collecting methods, Analysis, Earthquakes, Nuclear explosions, Detection, Geology.

The report summarizes four years of theoretical and applied research on propagation of seismic waves and techniques for analyzing data. Coherent optical processing techniques for analyzing seismic data were investigated and evaluated. Linear mode filtering, employing Fourier techniques, of seismic data was developed; it permits separating linear from elliptical ground motion. Frequency-analysis techniques involving optical, analog computer, digital computer, and active electronic filters were developed and evaluated. Radiation patterns from the regions of cylindrical and elliptical sources were investigated. Source motion was studied, using data from short-distance compressional waves. Theoretical studies of the scattering caused when an incident wave encounters an elliptical obstacle were conducted; both near-field and far-field effects were determined. A preliminary analysis of long-range refraction profiles obtained between Lake Superior and the Atlantic Ocean disclosed that anomalies in travel time and amplitude occur across the Michigan Basin and Appalachian Mountains. The anomaly across the Basin is substantiated by recordings of NTS events. A seismic-well monitoring station of intermediate depth was designed and put into operation; it reduces by a factor of ten microseismic background noise at frequencies above 1 cps. A processor to convert large-aperture seismic array (LASA) digital information into analog form was designed and partially constructed. (Author)

AD-639 954 See Field 8K

18B. ISOTOPES

AD-640 223 Field 18B, 7D
Not available from CFSTI.
California Univ., Berkeley.
NUCLEAR SPIN OF 45d IRON-59,
by B. M. Dodsworth, and H. A. Shugart. 19 Apr 65, 3p
Grant AF-AFOSR-62-346
Proj. AF-9767
Task 976702
AFOSR-66-1563
Prepared for presentation at the Washington, D. C. Meeting of the American Physical Society, April 26-29 1965. The document is comprised only of the abstract quoted below.
Availability: Published in Unidentified journal.

Descriptors: (*Iron, *Nuclear spins), Nuclear magnetic resonance, Nuclear shell models, Atomic energy levels, Line spectrum, Radioactive isotopes.

The nuclear spin of 45d Iron-59 was measured as 3/2 by the atomic beam, magnetic resonance method. This result is the same as that deduced previously from beta decay theory and is consistent with a shell model neutron assignment (p3/2) 3 (f5/2)2. The radioactivity was produced by the (n, gamma) reaction on natural iron metal. A tantalum oven containing a zirconium oxide liner was heated by electron bombardment to produce the beam of iron atoms. After traversing the beam machine, the activity was collected on either freshly deposited copper or sulfur surfaces and was counted in flow proportional beta counters. Because of the integral value of the electronic angular momentum in iron, only multiple quantum transitions are observable in the normal flop-in apparatus. Nineteen resonances were observed in the F = 11/2 and 9/2 levels of the quintuplet-D4 electronic state at magnetic fields up to approx. 27 gauss. Although structure appears on the resonance lines due to beam instability and possible resolution of multiple quantum transitions, the resonances indicate a nuclear spin of 3/2. (Author)

AD-640 224 Field 18B, 7D
Not available from CFSTI.
California Univ., Berkeley. Dept. of Physics.
NUCLEAR SPINS, HYPERFINE STRUCTURES, AND NUCLEAR MOMENTS OF SCANDIUM-46 AND YTTRIUM-91,
by F. Russell Petersen, and Howard A. Shugart. 25 Jun 62, 9p
Grant AF-AFOSR-62-346
Proj. AF-9767
Task 976702
AFOSR-66-1272
Availability: Published in The Physical Review v128 n4 p1740-6 Nov 15 1962.

Descriptors: (*Scandium, Nuclear magnetic resonance), (*Yttrium, Nuclear magnetic resonance), (*Nuclear spins, Radioactive isotopes), (*Hyperfine structure, Radioactive isotopes), (*Nuclear moments, Radioactive isotopes), Molecular beams, Quadrupole moments, Magnetic moments, Nuclear energy levels, Atomic energy levels.

The atomic-beam magnetic-resonance method was used to study some atomic and nuclear properties of 84-day Sc46 and 58-day Y91. The results are: Sc-46, I=4; uncorrected magnetic moment = +3.03 (2)nm; uncorrected quadrupole moment = +0.119 (6)b; 2 D 3/2 state gJ = -0.7990 (8); a = +150.576 (9) Mc/sec, b = +14.38 (14) Mc/sec; 2 D 5/2 state gJ = -1.1995 (18); a = +60.9069 (4) Mc/sec; b = +20.41 (10) Mc/sec. Y-91, I=1/2, uncorrected magnetic moment = plus or minus 0.1634 (8)nm; 2 D 3/2 state a = plus or minus 68.34 (2) Mc/sec; hyperfine structure = plus or minus 136.69 (3) Mc/sec; 2 D 5/2 state a = plus or minus 34.35 (3) Mc/sec; hyperfine structure = plus or minus 103.05 (4) Mc/sec. (Author)

AD-640 520 Field 18B, 20J
CFSTI Prices: HC$2.00 MF$0.50
Michigan Univ., Ann Arbor. Dept. of Physics.
SHELL MODEL CALCULATION IN 24Mg,
by T. Engeland, and K. Wathne. 1 Sep 66, 39p
Contract Nonr-1224 (59)
Prepared in cooperation with Oslo Univ. (Norway), Inst. of Physics.

Descriptors: (*Nuclear shell models, *Magnesium), Wave functions, Potential theory, Nuclear energy levels, Decay schemes, Groups (Mathematics), Nuclear particles, Stable isotopes.

Identifiers: Symmetry (Quantum mechanics).

A shell model calculation is performed for magnesium-24 assuming wave functions with maximum symmetry in the space coordinates. Several interactions are used, including the Kallio-Kolltveit hard core potential. A reasonable agreement is obtained for the energy levels, while the E2 branching ratios are in many cases different from the experimental values. The eigenfunctions have large overlap with the predicted SU3 wave functions. The influence of particle-hole excitations in the spectrum is discussed. (Author)

AD-640 399 See Field 20H

BNL-985 See Field 6R

DP-1009 See Field 7E

K-OA-1313 See Field 14A

MLM-1299 See Field 7E

MLM-1300 See Field 7E

ORO-647 See Field 22A

18C. NUCLEAR EXPLOSIONS

AD-640 428 Field 18C, 11L, 21B
CFSTI Prices: HC$1.00 MF$0.50
Naval Applied Science Lab., Brooklyn, N. Y.
CRITICAL RADIANT EXPOSURES FOR IGNITION OF TINDER AND COMBUSTIBLE MATERIALS (PART I - WOOD).
Technical memo.
15 Jan 65, 22p Rept. no. 9400-12, TM-5
Task DASA-12.009

Descriptors: (*Wood, Ignition), Thermal radiation, Nuclear explosions, Simulation, Explosion effects, Experimental data.

Wood in six different forms was exposed to thermal radiation from simulated nuclear weapons pulses in the range from 65 kilotons to 100 megatons. Sawdust from weathered wood was most readily ignited, glowing ignition occurring at 6.4 cal/sq cm for a 65 kt pulse, and at 21 cal/sq cm for a 100 Mt pulse. Clean, unseasoned douglas fir, one-half-inch thick, was ignited to sustained flaming at radiant exposures of 31 and 68 cal/sq cm for yields of 1.2 and 108 Mt, respectively. Weathered douglas fir could be ignited only to short-lived afterglow which extinguished itself shortly after exposure. Yellow poplar, clean, 1/16-inch thick, was ignited to sustained flaming at 33 and 71 cal/sq cm for pulses simulating weapon yields of 1.2 and 108 Mt, respectively; excelsior ignited at 29 and 53 cal/sq cm for the same pulses. Sustained flaming of the unseasoned douglas fir is a significant finding which is contrary to previous experience. The heavy resin content of the specimens studied in these tests is obviously a factor. (Author)

AD-640 440 Field 18C, 13M
CFSTI Prices: HC$3.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
MOTION OF SUBSURFACE SOIL INCLUSIONS SUBJECTED TO SURFACE BLAST LOADING - RESULTS OF SERIES II TESTS.
Technical rept.,
by L. W. Heller. Oct 66, 52p TR-R-483
Proj. Y-F008-08-02-112
DASA-13.018

Descriptors: (*Underground structures, Blast), Motion, Shock waves, Nuclear explosions, Simulation, Soil mechanics, Loading (Mechanics).

Tests were conducted to determine how shape and mass affect the motion of buried inclusions subjected to blast loading applied to the surface of the soil. Five inclusions, representing elemental portions of a buried complex, were placed 6 inches below the surface of a dry sand material sieved into a reinforced-concrete test container. Two of the inclusions had the same shape and stiffness

but differed in mass. The three other inclusions had comparable mass and stiffness but differed in shape. The displacement and acceleration of the inclusions and the displacement of the soil at two elevations were measured during a sequency of 13 blast loadings at peak overpressure levels of 5 to 25 psi. Reed gages were attached to one inclusion and cantilevered into the soil to indicate the motion of the inclusion with respect to the surrounding soil. Accurate measurement of inclusion motion was not made. However, the following results were obtained: (1) the reed gages indicated that the inclusion displaces into the soil in the direction of the propagated soil stress wave, (2) an increase in the mass of an inclusion by a factor of 13 only halved its peak acceleration, and (3) differences in shape of the inclusions tested resulted in only 10% to 15% differences in their peak accelerations. A tentative method for estimating the blast-induced differential motion between a structural inclusion and its surrounding soil field is described. (Author)

N66-35737 **Field 18C**
CFSTI Prices HC$2.00 MF$0.50
Pittsburgh Univ., Pa. Space Research Coordination Center.
DETECTION OF HIGH ALTITUDE EXPLOSIONS BY OBSERVATION OF AIR FLUORESCENCE.
by T. M. Donahue. 4 Nov 65, 30p NASA-CR-68355, SRCC-19
Contract NASR-179

Descriptors: *Detection, *Fluorescent emission, *Nitrogen, *Nuclear explosion, Blue, Bomb, Emission, Explosion, Fluorescence, Geophysics, High altitude, Ion, Molecule, Nuclear, Pulse, Radiation, Red, Satellite.

For abstract, see S 04 21.

PNE-603F **Field 18C, 8M**
CFSTI Prices: HC$2.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Livermore.
SURFACE MOTION MEASUREMENTS,
by R. W. Terhune. Dec 65, 116p
Contract W-7405-eng-48
Report on Project Dugout.

Descriptors: (*Cratering, *Soil mechanics).

For abstract, see N 20 20.

UCRL-12172 **Field 18C, 8M**
CFSTI Prices: HC$2.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Livermore.
NUCLEAR CRATERING EXPERIENCE AT THE PACIFIC PROVING GROUNDS,
by Louis J. Circeo Jr, and Milo D. Nordyke. 10 Nov 64, 92p
Contract W-7405-eng-48

Descriptors: (*Cratering, Nuclear explosions).

For abstract, see N 20 19.

AD-639 661 See Field 20F

PB-172 420 See Field 8J

PNE-515 See Field 19D

UCRL-14440 See Field 13M

18D. NUCLEAR INSTRUMENTATION

AD-640 298 **Field 18D**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
MATERIAL FOR MANUFACTURING IONIZING CHAMBERS WHICH MEASURE THE DOSE OF X-RAY RADIATION,
by E. F. Garapov, M. F. Lebedeva, and K. I. Shchekin. 18 Apr 66, 6p FTD-TT-65-1302
Unedited rough draft trans. of Patent (USSR) 169 776, appl. 819 447/23-26, 18 Feb 63.

Descriptors: (*Ionization chambers, Materials), (*X rays, Dosage), Polyethylene plastics, Graphite, Patents, USSR.

The proposed material for making ionization chambers which measure the dose of X-ray radiation, consists of 45 to 50% of polyethylene and 50 to 55% of graphite. Such a composition makes it possible to prepare chambers which possess a 'run with rigidity' of plus or minus 10%. (Author)

ANL-7174 **Field 18D, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
AUTOMATIC SCAN SYSTEM FOR REACTOR-FUEL ASSAY,
by Thomas H. Busse, and Norman S. Beyer. Mar 66, 10p
Contract W-31-109-eng-38

Descriptors: (*Nuclear radiation spectrometers, *Reactor fuels).

For abstract, see N 20 19.

ANL-7178 **Field 18D, 18I**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
STEADY-STATE DIFFERENTIAL CALORIMETER USED TO MEASURE GAMMA HEATING IN A REACTOR ENVIRONMENT,
by Dale A. Herbst, and James H. Talboy. Mar 66, 31p
Contract W-31-109-eng-38

Descriptors: (*Calorimeters, Reactor operation).

For abstract, see N 20 19.

BNWL-15 **Field 18D**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
IMPROVED CARTRIDGE-TYPE LINEAR VARIABLE DIFFERENTIAL TRANSFORMER,
by W. B. Weihermiller. Jan 65, 12p
Contract AT (45-1)-1830

Descriptors: (*Transformers, Design).

For abstract, see N 20 19.

BNWL-260 **Field 18D**
CFSTI Prices: HC$3.00 MF$0.75
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PRECISION LONG COUNTER FOR MEASURING FAST NEUTRON FLUX DENSITY,
by J. De Pangher, and L. L. Nichols. Jun 66, 62p
Contract AT (45-1)-1830

Descriptors: (*Neutron counters, Fast neutrons).

For abstract, see N 20 20.

DP-993 **Field 18D**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
PORTABLE MULTIPURPOSE RADIATION MONITOR,
by William F. Splichal Jr. May 66, 13p
Contract AT (07-2)-1

Descriptors: (*Radiation monitors, Design).

For abstract, see N 20 20.

LA-3498 **Field 18D, 20**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
THE SILVER COUNTER A DETECTOR FOR BURSTS OF NEUTRONS,
by Robert J. Lanter, and Daniel E. Bannerman. Apr 66, 36p
Contract W-7405-eng-36

Descriptors: (*Neutron counters, Design).

For abstract, see N 20 19.

N66-36064 **Field 18D**
CFSTI Prices HC$2.00 MF$0.50
Chicago Univ., Ill. Lab. For Astrophysics And Space Research.
HIGH TEMPERATURE BEHAVIOR AND LONG-TERM STABILITY OF LITHIUM DRIFTED SILICON SURFACE-BARRIER DETECTORS.
by J. Kristoff, M. A. Perkins, and A. J. Tuzzolino. 1966, 41p NASA-CR-77806
Grant NSG-179-61
Submitted For Publication

Descriptors: *Charged particle, *Particle detector, *Silicon radiation detector, Barrier, Behavior, Characteristics, Charge, Detector, Drift, Fabrication, High temperature, Instrumentation, Lithium, Operation, Particle, Silicon, Stability, Surface.

For abstract, see S 04 21.

PB-173 240 **Field 18D**
CFSTI Prices: HC$10.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
COMPORTEMENT EN TEMPERATURE DES COUCHES PHOTOEMISSIVES. CAS DES PHOTOMULTIPLICATEURS UTILISES DANS LES COMPTEURS A SCINTILLATIONS (Temperature Behaviour of Photo-Emissive Films. The Case of Photomultipliers Used in Scintillation Counters).
Doctoral thesis,
by Abdul-Hamid Ardalan. 1966, 103p CEA-R-2995
Text in French; Attached Summary in English.

Descriptors: (*Scintillation counters, *Photomultipliers), (*Photocathodes, Sensitivity), Cesium compounds, Antimony alloys, Thermal properties, Emissivity, Photoelectric effect, Films, France.

Identifiers: Cesium antimonide.

The work concerns the changes in the spectral sensitivity of 3 types of normal photo-cathodes (Cs3Sb, tri-alkali and bi-alkali without caesium) as a function of temperature. The photo-cathodes of cathodes of commercial photo-multipliers were used for these tests. The temperature range studied was -25C to + 55C (except for the bi-alkali photo-cathodes which were tested up to + 150C) and the wave-length range was 3,250 to 7,000A. After a brief review of photo-electric effect theories, the experimental device is described and the measurement results presented. Finally, an interpretation of these results is proposed. For the normal range of scintillator emission, i.e. between 3,000 and 5,000A (NaI (T1), plastics, anthracene) the temperature coefficient is always negative: - 0.15%C for Cs3Sb and up to - 0.5%C for the most temperature-sensitive photo-cathode. Above 5,000A, the temperature coefficient of Cs3Sb films becomes positive: + 0.5%C on the average. The accuracy of the spectral sensitivity measurements is plus or minus 4% in absolute value and plus or minus 1% in relative value. (Author)

AD-640 317 See Field 20L

ANL-7164 See Field 7D

IDO-17182 See Field 6R

MLM-1300 See Field 7E

ORNL-3960 See Field 7D

UCRL-16869 See Field 7D

18E. NUCLEAR POWER PLANTS

NYO-2764-2 Field 18E
CFSTI Prices: HC$7.00 MF$1.75
Ford Instrument Co., Long Island City, N. Y.
FEASIBILITY STUDY OF A UNIFIED DIGITAL INSTRUMENTATION AND CONTROL SYSTEM FOR NUCLEAR POWER PLANTS.
Final rept., Apr 61-Jun 65,
by D. Gertz, and J. Levine. 30 Jun 65, 369p
Contract AT (30-1)-2764

Descriptors: (*Nuclear power plants, Digital systems).

For abstract, see N 20 20.

ORO-649 Field 18E
CFSTI Prices: HC$5.00 MF$1.00
Oak Ridge Operations Office (AEC), Tenn.
BOILING NUCLEAR SUPERHEATER (BONUS) POWER STATION PUNTA HIGUERA SITE NEAR RINCON, PUERTO RICO.
Jun 66, 160p

Descriptors: (*Nuclear power plants, Puerto Rico).

For abstract, see N 20 20.

18F. RADIATION SHIELDING AND PROTECTION

AD-640 260 Field 18F, 20H
CFSTI Prices: HC$2.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
A RANDOM WALK TREATMENT OF NEUTRON DIFFUSION IN SLABS.
Technical rept., Jul 65-May 66,
by M. L. Eaton, and C. M. Huddleston. Sep 66, 43p TR-R-482
Proj. Y-R011-01-101

Descriptors: (*Neutron transport theory, Numerical analysis), (*Shielding, Neutron transport theory), Neutrons, Backscattering, Neutron scattering, Probability, Diffusion, Absorption, Albedo, Shelters.

Identifiers: Random walk, Markov chains.

The concept of a Markov chain was used to treat the random processes of scatter and absorption which occur when neutrons are incident on a slab of finite thickness, such as a shield or an inside wall of a shelter entranceway. It is assumed that scattering is isotropic in the laboratory system and that the scattering and absorption cross sections do not change during a neutron-scattering history. The encouraging results obtained to date indicate that for thin slabs the analytical random walk method may have important advantages over Monte Carlo calculations (which require lengthy computer runs to obtain acceptably small statistical variances), moments method calculations (which are actually appropriate only for infinite medium cases), and numerical solutions of the neutron transport equation (which are lengthy, tedious, and necessarily approximate). (Author)

AD-640 491 Field 18F, 11G
CFSTI Prices: HC$3.00 MF$0.75
Naval Radiological Defense Lab., San Francisco, Calif.
THREE TESTS OF FIREHOSING TECHNIQUE AND EQUIPMENT FOR THE REMOVAL OF FALLOUT FROM ASPHALT STREETS AND ROOFING MATERIALS,
by Lyman L. Wiltshire, and Leigh W. Owen. 18 Oct 66, 78p USNRDL-TR-1048
Proj. OCD-TO-65-200 (22)

Descriptors: (*Asphalt, Decontamination), (*Roads, Decontamination), (*Roofs, Decontamination), Radioactive fallout, Cleaning, Surface properties, Roughness, Particle size, Hoses.

The report describes three separate firehosing experiments. Each employed radio-traced simulant in order to measure removal effectiveness. It was concluded that: (1) Effectiveness of reclamation by firehosing improves as surface roughness decreases and particle size increases. (2) Removal effectiveness improves with effort, but the residual mass is not significantly reduced after the second pass. (3) The flare nozzle is consistently more effective than the fire nozzle in cleaning roof surfaces. This is not the case for paved surfaces. (4) Results from full scale tests show that the removal effectiveness can never equal that achieved under the less realistic operating conditions represented by smaller engineering-scale tests. (5) RN2 exposure reduction factors are not significantly affected by surface roughness, particle size or mass loading. (Author)

N66-27487 Field 18F
CFSTI Prices HC$7.00 MF$2.25
National Aeronautics And Space Administration, Washington, D. C.
RADIATION SAFETY DURING SPACE FLIGHTS.
by V. G. Bobkov, V. P. Demin, I. B. Keirim-markus, YE. YEKovalev, and A. V. Larichev. May 66, 422p NASA-TT-F-356
Transl. Into English Of The Book "radiatsionnaya Bezopasnost Pri Kosmicheskikh Poletakh" Moscow, Atomizdat., 1964

Descriptors: *Dosimetry, *Manned space flight, *Radiation hazard, *Shielding, Cosmic, Damage, Earth, Field, Forecasting, Hazard, Magnetic, Manned, Radiation, Space flight, Tissue, Zone.

For abstract, see S 04 15.

N66-27959 Field 18F
CFSTI Prices HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn. Radiation Shielding Information Center.
ABSTRACTS OF THE LITERATURE EXAMINED BY THE RADIATION SHIELDING INFORMATION CENTER (SPACE AND ACCELERATOR SHIELDING).
1965, 48p NASA-CR-75575, ORNL-RSIC-12
NASA ORDER R-104

Descriptors: *Abstract, *Acceleration protection, *Radiation shielding, Acceleration, Annotation, Biological, Bremsstrahlung, Neutron, Nuclear, Particle, Plasma, Protection, Radiation, Shielding, Space.

For abstract, see S 04 15.

PB-173 191 Field 18F
CFSTI Prices: HC$2.60 MF$0.50
Commissariat a l'Energie Atomique, Chusclan (France). Centre de Production de Plutonium de Marcoule.
ETUDE DE LA PERMEABILITE AU TRITIUM DE DIFFERENTS MATERIAUX (Study of the Permeability of Certain Materials to Tritium),
by Bernard Caire, and Yves Sutra-Fourcade. Aug 66, 22p CEA-R-3018
Availability: Published in Text in French; Attached summary in English.

Descriptors: (*Tritium, *Shielding), Containers, Permeability, Gases, Heavy water, Safety, Handling, Helium, Rubber, Plastics, Composite materials, France.

The aim of this work is to classify certain materials intended for use as a protection against gaseous tritium and tritiated water. The first part deals with active tests and gives an account of phenomena encountered with very small quantities of element. The second part of this report concerns a series of tests carried out using helium and inactive water. (Author)

PB-173 245 Field 18F, 7D
CFSTI Prices: HC$6.60 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
CONTRIBUTION A L'ETUDE DE LA PRECIPITATION ELECTROSTATIQUE DES AEROSOLS (Contribution to the Study of the Electrostatic Precipitation of Aerosols),
by Guy Madelaine, and Lucien Roure. Sep 66, 63p CEA-R-3069
Text in French; Attached summary in English.

Descriptors: (*Aerosols, *Electrostatic precipitation), (*Radioactive isotopes, Electrostatic precipitation), Instrumentation, Aerodynamics, Laminar flow, Electric fields, Electrodes, France.

The first part is devoted to the theory of the electrostatic precipitation of ions in a cylindrical apparatus. Some aerodynamic factors influencing the quality of the flow are deduced. The second part of the report deals with the experimental verification of the hypotheses concerning the laminarity of the gas flow. The presence of a guard tube which ensures a steady state of velocity and which reduces electrical field end-effects should make it possible to obtain a better knowledge of the distribution function of the captured particles. The third part deals with the treatment of the results and with the processing method making it possible to obtain the spectral distribution of the particles captured on the electrode. (Author)

MLM-1299 See Field 7E

18G. RADIOACTIVE WASTES

UCRL-14903 Field 18G, 13D
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
IMPROVED SHIPPING CONTAINER FOR FISSILE MATERIAL,
by James R. Gaskill, and Robert D. Taylor. 3 Jun 66, 28p
Contract W-7405-eng-48

Descriptors: (*Containers, *Fission products).

For abstract, see N 20 19.

DP-1023 See Field 11F

IDO-17182 See Field 6R

ORNL-3931 See Field 7E

18H. RADIOACTIVITY

AD-639 748 Field 18H, 18J, 11F
CFSTI Prices: HC$2.00 MF$0.50
Naval Research Lab., Washington, D. C.
DAMAGING NEUTRON EXPOSURE CRITERIA FOR EVALUATING THE EMBRITTLEMENT OF REACTOR PRESSURE VESSEL STEELS IN DIFFERENT NEUTRON SPECTRA.
Interim rept.,
by Charles Z. Serpan Jr, and Lendell E. Steele.
28 Jul 66, 31p NRL-6415
Contract AT (49-5)-2110
Projs. RR007-01-46-5409, SF020-01-25-0858

Descriptors: (*Steel, *Radiation damage), Embrittlement, Pressure vessels, Reactor materials, Neutron flux, Nuclear reactors, Determination, Transition temperature.

Several such exposure criteria have been evaluated through use of the results of metallurgical tests of reference steel specimens after irradiation in light and heavy water moderated reactor environments as well as in graphite moderated reactor environments. The radiation-induced transition temperature or nil-ductility transition (NDT) temperature increases of the several steels involved are presented versus n/cm2 determined by each of the following techniques: (a) assumption of a fission spectrum, extrapolation of activation data induced at a high Mev threshold to 1 Mev, and reporting exposure > 1 Mev, and (b) calculation of spectra used to determine activation cross section for exposures above energy limits of 1, 0.5, and 0.183 Mev. The differences observed by this analysis were intercompared in relation to absolute magnitude as well as in terms of engineering significance. By applying these criteria to data relating directly to a pressurized light water power reactor, benefits to the lifetime of the reactor can be realized. The results of this study to date indicate that data relating to the properties of steels irradiated in or near the core of pressurized light water moderated reactors can be confidently intercompared for engineering applications assuming a fission spectrum and accounting for neutrons of energies >1 Mev. On the other hand, calculated spectra and average cross section adjustment to an energy limit as low as >0.183 Mev must be applied to data from highly moderated reactors. (Author)

AD-640 154 **Field 18H**
CFSTI Prices: HC$2.00 MF$0.50
Radiation Research Associates, Inc., Fort Worth, Tex.
SIMULATION OF FALLOUT GAMMA RADIATION FIELDS BY MONOENERGETIC PLANE ISOTROPIC SOURCES.
Preliminary draft,
by R. L. French. 23 Apr 65, 26p RRA-M51
Contract DA-49-146-XZ-254
Prepared for presentation at the Annual Meeting of the American Nuclear Society (1965) Gatlinburg, Tennessee, June 21-24, 1965.

Descriptors: (*Gamma rays, Radioactive fallout), (*Radioactive fallout, Simulation), Fission product activity, Monte Carlo method, Cerium, Cesium, Cobalt, Shielding, Photons.

Monte Carlo techniques were used in a study of the gamma radiation environment three feet in air above plane sources of monoenergetic and fission-product gamma radiation. The scattered and direct-beam fluxes were computed in each of the receiver energy intervals between 0.04 and 3.5 MeV and eighteen 10-degree receiver angle intervals between 0 degrees (nadir) and 18 degrees (zenith). Source energies of 0.10, 0.67, and 1.25 MeV, which are representative of the gamma rays from 144 Ce, 137 Cs, and 60 Co respectively, were used in the calculations. Additional calculations were performed for source energies of 0.14, 0.25, 0.40, 0.85, 1.75, 2.50, and 3.50 MeV so that the results could be weighted with the gamma-ray spectra from fallout of various ages. Detailed comparisons of the results show that the angular distribution of the dose from a fallout field is simulated with reasonable accuracy over most angles by a plane source of 137 Cs or 60 Co and over all angles by a mixture of 144 Ce, 137 Cs, and 60 Co. The simulation of the fallout energy spectra is quite poor, however, even if combinations of the three isotopes are employed. Comparisons of the Monte Carlo data with measured data for monoenergetic plane sources show good agreement. (Author)

AD-640 529 **Field 18H, 9A**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
EFFECTS OF ELECTRON IRRADIATION OF METAL-NITRIDE-SEMICONDUCTOR INSULATED GATE FIELD-EFFECT TRANSISTORS,
by Alan G. Stanley, and Richard H. A. Wegener.
16 Feb 66, 3p JA-2761
Contract AF 19 (628)-5167
ESD-TR-66-390
Availability: Published in Proceedings of the IEEE v54 n5 p784-5 May 1966.

Descriptors: (*Transistors, Radiation damage), (*Semiconductor devices, *Radiation damage), Electron bombardment, Metals, Oxides, Semiconductors, Nitrides, Leakage (Electrical), Silicon compounds.

Identifiers: Field-effect transistors.

The effects of electron irradiation on metal-nitride-semiconductor (MNS) insulated gate field effect transistors and on MOS devices are compared under different bias conditions. The MNS devices produced considerably smaller shifts in gate turn-on voltage depending on the fabrication process and source-drain leakage currents below 10 to the minus 9 amps. (Author)

CEX-61.7.2 **Field 18H, 8G, 6R**
CFSTI Prices: HC$1.00 MF$0.50
Geological Survey, Washington, D. C.
AERORADIOACTIVITY SURVEY AND GEOLOGY OF PUERTO RICO (ARMS-I),
by Jules A. Mackallor. Mar 64, 24p

Descriptors: (*Natural radioactivity, Puerto Rico), (*Geology, Puerto Rico).

For abstract, see N 20 19.

N66-28183 **Field 18H**
CFSTI Prices HC$3.00 MF$0.50
Finnish Meteorological Office, Helsinki.
OBSERVATIONS OF RADIOACTIVITY FOR THE YEAR 1964, NO. 4.
1965, 68p

Descriptors: *Beta radiation, *Dust, *Geiger counter, *Precipitation particle measurement, *Rain, Activity, Aerosol, Air, Beta, Computer, Cylinder, Decay, Filter, Flow, Geiger-mueller counter, Isotope, Program, Radiation, Radioactivity, Water.

For abstract, see S 04 15.

PB-170 902 **Field 18H**
CFSTI Prices: HC$3.00 MF$0.50
Smithsonian Astrophysical Observatory, Cambridge, Mass.
PARTICLE EVAPORATION FROM EXCITED NUCLEI.
Special rept. on Research in Space Science,
by Henri E. Mitler. 11 Mar 66, 51p 12-65-14, SAO-SR-204

Descriptors: (*Nuclei, *Radioactive decay), Excitation, Evaporation, Nucleons, Neutrons, Protons, Equations, Neutron spectrum, Nuclear energy levels.

Simple semiempirical analytic formulas are developed for the mean number of neutrons, protons, and heavier particles evaporated from nuclei excited to a given energy. The total mass loss is also found. The expression Omega (U) approx. exp (-2 (sq. root (aU))) for the level density is found to give a better fit to the data than 1/U sq exp (-2 (sq root (aU))). The variation of nuclear temperature during an evaporation chain is found. The results agree very well with the Monte Carlo calculations of Dostrovsky, Rabinowitz, and Bivins (Phys. Rev. v111 p1659 1958) and are similar to those of Le Couteur (Proc. Phys. Soc. vA65 p718 1952). A new expression is derived for the energy spectra of evaporated neutrons, for both single and sequential decays, which fits the data very well. (Author)

PNE-717F **Field 18H, 6R, 13L**
CFSTI Prices: HC$2.00 MF$0.75
Reynolds Electrical and Engineering Co., Inc., Mercury, Nev.
ON-SITE RADIOLOGICAL SAFETY REPORT,
by Leslie McClendon. Jul 65, 59p
Contract AT (29-2)-162
Rept. on Project Sulky.

Descriptors: (*Radiological dosage, *Nuclear explosions).

For abstract, see N 20 20.

AD-473 931 **See Field 8J**

AD-640 257 **See Field 20L**

N66-28104 **See Field 20H**

PB-172 420 **See Field 8J**

18I. REACTOR ENGINEERING AND OPERATION

ANL-7143 **Field 18I, 18K**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
REACTOR OSCILLATOR DETERMINATION OF CAPTURE-TO-FISSION RATION IN AN UNDERMODERATED CRITICAL ASSEMBLY,
by W. C. Redman, and M. M. Bretscher. Jan 66, 67p
Contract W-31-109-eng-38

Descriptors: (*Critical assemblies, *Reactor lattice parameters).

For abstract, see N 20 19.

ANL-7219 **Field 18I, 18J**
CFSTI Prices: HC$4.00 MF$0.75
Argonne National Lab., Ill.
REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT, MAY 1966.
30 Jun 66, 99p
Contract W-31-109-eng-38

Descriptors: (*Nuclear reactors, Nuclear engineering).

For abstract, see N 20 19.

BNL-963 **Field 18I, 20D**
CFSTI Prices: HC$2.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
A SPACE-INDEPENDENT MODEL OF TWO-PHASE FLOW AND ITS APPLICATION TO EXPERIMENT,
by Louis M. Shotkin. Jan 66, 28p
Contract AT-30-2-GEN-16

Descriptors: (*Two phase flow, *Mathematical models).

For abstract, see N 20 20.

BNWL-186 **Field 18I**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
TIME OPTIMAL XENON SHUTDOWN ON THE XENON BOUNDARY,
by Jeffery Lewins, and R. D. Benham. May 66, 39p
Contract AT (45-1)-1830

Descriptors: (*Reactor shutdown, *Xenon).

For abstract, see N 20 20.

CONF-650413 **Field 18I**
CFSTI Prices: HC$4.50 MF$2.50
Arizona Univ., Tucson. Dept. of Nuclear Engineering.
NEUTRON DYNAMICS AND CONTROL. PROCEEDINGS OF THE SYMPOSIUM ON NUCLEAR ENGINEERING AT THE UNIVERSITY OF ARIZONA, TUCSON, APRIL 5-7, 1965, AEC SYMPOSIUM SERIES NO. 7.
1965, 612p
Contract AT (11-1)-676

Descriptors: (*Sumposia, *Nuclear engineering).

For abstract, see N 20 19.

IDO-17190 Field 18I, 18J, 18L, 11F
CFSTI Prices: HC$5.00 MF$1.00
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
FINAL DISASSEMBLY AND EXAMINATION OF THE ML-1 REACTOR CORE.
by T. L. Murphy, D. R. Schuyler, and W. L. Clarke, Jr. Jun 66, 155p
Contract AT (10-1)-205

Descriptors: (*Reactor cores, Analysis).

For abstract, see N 20 19.

IITRI-578P22-15 Field 18I
CFSTI Prices: HC$4.00 MF$0.75
IIT Research Inst., Chicago, Ill.
STUDIES OF REACTOR CONTAINMENT STRUCTURES.
Final rept.,
by M. A. Salmon. Jun 66, 113p
Contract AT (11-1)-578

Descriptors: (*Containment, Reactor system components).

For abstract, see N 20 20.

NAA-SR-11900 Field 18I, 18J, 18K
CFSTI Prices: HC$5.00 MF$1.00
Atomics International, Canoga Park, Calif.
AEC UNCLASSIFIED PROGRAMS. QUARTERLY TECHNICAL PROGRESS REPORT, JANUARY-MARCH 1966.
6Jun 66, 170p
Contract AT (11-1)-GEN-8

Descriptors: (*Fast reactors, *Liquid metal cooled reactors).

For abstract, see N 20 19.

NAA-SR-12001 Field 18I
CFSTI Prices: HC$1.00 MF$0.50
Atomic International, Canoga Park, Calif.
ERRORS IN MEASUREMENTS OF BUILDING LEAKAGE DUE TO DYNAMIC TEMPERATURE EFFECTS,
by C. T. Nelson, M. A. Greenfield, and R. L. Koontz. 1 Aug 66, 19p
Contract AT (11-1)-GEN-8

Descriptors: (*Containment, *Reactor systems components).

For abstract, see N 20 20.

N66-28017 Field 18I
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
IRRADIATION SYSTEM FOR CRYOGENIC EXPERIMENTS IN THE PLUM BROOK REACTOR.
by F. A. Haley, and R. R. Wyer. 1966, 27p
NASA-TM-X-52203
Presented At The Intern. Symp. On Develop. In Irradiation Capsule Technol., Pleasanton, Calif., 3-5 May 1966, Sponsored By Aec And Ge

Descriptors: *Cryogenics, *Irradiation, *Plum brook reactor, Acquisition, Capsule, Data, Helium, Insertion, Nuclear, Rocket.

For abstract, see S 04 15.

N66-29513 Field 18I
CFSTI Prices HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
MASS-RETENTION MEASUREMENTS IN A BINARY COMPRESSIBLE VORTEX FLOW.
by T. J. Pivirotto. 15 Jun 66, 31p NASA-CR-75932, JPL-TR-32-864
Contract NAS7-100

Descriptors: *Compressible flow, *Reactor, *Vortex flow, Binary, Compressible, Decay, Discharge, Field, Flow, Freon, Fuel, Hydrogen, Nitrogen, Nuclear, Rate, Retention, Vortex.

For abstract, see S 04 16.

ORNL-3901 Field 18I, 13L, 6R
CFSTI Prices: HC$3.00 MF$0.50
Oak Ridge National Lab., Tenn.
THE ADEQUACY OF SCALE-UP IN EXPERIMENTS ON FISSION-PRODUCT BEHAVIOR IN REACTOR ACCIDENTS. PART I. AN ANALYSIS OF SCALE-UP IN THE U. S. NUCLEAR SAFETY PROGRAM,
by C. E. Miller Jr. and W. E. Browning Jr. Jul 66, 57p
Contract W-7405-eng-26

Descriptors: (*Reactor accidents, *Fission product activity).

For abstract, see N 20 19.

PB-170 913 Field 18I
CFSTI Prices: HC$11.60 MF$0.75
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
ETUDE EXPERIMENTALE DES INSTABILITIES HYDRODYNAMIQUES SURVENANT DANS LES REACTEURS NUCLEAIRES A EBULLITION (Experimental Study of the Hydrodynamic Instabilities occuring in Boiling-Water Reactors).
Doctoral thesis in French,
by Serge Fabrega. 1966, 121p CEA-R-2884
Text in French; Attached Summary in English.

Descriptors: (*Boiling water reactors, Hydrodynamics), Stability, Barometric pressure, Oscillation, France.

The subjects is an experimental out-of pile loop study of the hydrodynamic oscillations occuring in boiling-water reactors. The study was carried out at atmospheric pressure and at pressure of about 8 atmospheres, in channels heated electrically by a constant and uniform specified current. In the test at 8 atmospheres the channel was a round tube of approximately 6 mm interior diameter. At 1 atmosphere a ring-section channel was used, 10 X 20 mm in diameter, with an inner heating tube and an outer tube of pyrex. It was possible to operate with natural convection and also with forced convection with test-channel by-pass. The study consists of 3 parts: (1) Preliminary determination of the laws governing pressure-drop during boiling. (2) Determination of the fronts at which oscillation appears, within a wide range of the parameters involved. (3) A descriptive study of the oscillations and measurement of the periods. The report gives the oscillation fronts with natural and forced convection for various values of the singular pressure drop at the channel inlet and for various riser lengths. The results are presented in adimensional form, which is available, in first approximation, for all geometric scales and for all fluids. Besides the following points were observed: the wall (nature and thickness) can be an important factor; oscillation can occur in a horizontal channel. (Author)

PB-173 181 Field 18I, 18L
CFSTI Prices: HC$11.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
BOUCLE DE SOUFFLAGE DE LA CENTRALE EL. 4 - REGULATION DU DEBIT CO2 - ETUDE ANALOGIQUE (Blowing Loop in the El 4 Reactor: CO2 Flow Control Analogue Study),
by Claude LeRoy, Louis Robin, Jean-Claude Jacquin, Alain Cornudet, and Guy Chazal. 1966, 115p CEA-R-2793
Text in French; Attached Summary in English.

Descriptors: (*Gas-cooled reactors, Reactor coolants), (*Power reactors, Reactor coolants), (*Reactor coolants, *Carbon dioxide), Gas flow, Control systems, Analog systems, Heat exchangers, Blowers, Analog computers, Programming (Computers), Equations, Heavy water reactors, France.

Identifiers: Brittany Power Reactor (EL-4).

The report describes one study which contributed to the construction of the Monts d'Arree nuclear power station: EL 4. The reactor is cooled by a CO2 current provided by 3 turbo-blower groups. The priming vapour for the turbines is taken at the exit of the main CO2 - H2O exchangers. The operation of EL 4 is based on a high degree of centralization of the controls which attributes an important role to the general regulation circuits. This general regulation includes in particular an internal blowing loop which controls the CO2 flow. The study of the control of this CO2 flow is made up of 3 parts: (1) analogue representation of the reactors cooling circuit and of the turbo-blower unit; (2) first test campaign using the analogue computer describing the natural behaviour of the system in the absence of control; (3) theoretical determination of the regulation factors; definition of the regulation using an analogue computer and second test campaign for recording the performances of the blowing loop. The 4th part of the report deals with the analogue study: analogue equations - development. (Author)

WCAP-6080 Field 18I, 18J, 18L
CFSTI Prices: HC$4.00 MF$0.75
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
YANKEE CORE EVALUATION PROGRAM. QUARTERLY PROGRESS REPORT FOR THE PERIOD ENDING MARCH 31, 1966,
by M. J. Oboyle. Jun 66, 108p
Contract AT (30-1)-3017

Descriptors: (*Reactor cores, Tests), (*Power reactors, Reactor cores).

For abstract, see N 20 19.

ANL-6950 See Field 18J

ANL-7178 See Field 18D

BNL-959 See Field 7A

LA-3396 See Field 6R

LA-3447 See Field 6R

LA-3491 See Field 7D

NAA-SR-6322 See Field 21F

ORNL-3951 See Field 18J

18J. REACTOR MATERIALS

AD-639 835 Field 18J, 11F
CFSTI Prices: HC$2.00 MF$0.50
Naval Research Lab., Washington, D. C.
IRRADIATION EFFECTS ON REACTOR STRUCTURAL MATERIALS.
Quarterly progress rept., 1 May-31 Jul 66,
by Lendell E. Steele, J. Russell Hawthorne, Robert A. Gray Jr, Eugene P. Klier, and Charles Z. Serpan Jr. 15 Aug 66, 39p NRL-MR-1719
Projs. RR007-01-45-5409, SF-020-01-05-0858
Research supported in part by AEC Contract AT (49-5)-2110.

Descriptors: (*Radiation damage, *Reactor materials), (*Reactor system components, Reactor materials), Steel, Embrittlement, Tensile properties.

The research program of the NRL Metallurgy Division, Reactor Materials Branch, is devoted to the determination of the effects of nuclear radia-

tion upon the properties of structural materials. The overall program is sponsored by the Office of Naval Research, the Naval Ship Systems Command, the U. S. Atomic Energy Commission, and the Army Nuclear Power Program. Since research findings which apply to the objectives of one sponsoring agency are also of interest to the others, the overall program progress is reported herein. This report includes the following: (1) results of a comparative irradiation of weld heat affected zone and base metal specimens of HY-80 steel, (2) preliminary data on the notch ductility characteristics of irradiated maraging and nickel-cobalt steels, (3) tensile properties of selected steels having potential for nuclear structural application, (4) irradiation damage surveillance results from specimens exposed near the Yankee reactor pressure vessel, and (5) description of the recently completed metallographic cell of the NRL High Level Radiation Laboratory. (Author)

ANL-6950 **Field 18J, 18I, 14A, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
COST ESTIMATE FOR REMOTE REFABRICATION OF METALLIC FUELS,
by J. E. Ayer, D. A. Jones, and D. D. Ebert. Mar 66, 30p
Contract W-31-109-eng-38

Descriptors: (*Cost effectiveness, *Reactor fuel processing), (*Programming (Computers), Cost effectiveness).

For abstract, see N 20 20.

BMI-1760 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
THE COMPATIBILITY OF URANIUM NITRIDE WITH POTENTIAL CLADDING METALS,
by David E. Price, Donald P. Moak, Walston Chubb, and Donald L. Keller. 8 Feb 66, 41p
Contract W-7405-eng-92

Descriptors: (*Reactor fuels, *Reactor fuel cladding).

For abstract, see N 20 20.

BMI-1767 **Field 18J, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING MARCH, 1966,
by Donald L. Keller. 1 Apr 66, 37p
Contract W-7405-eng-92

Descriptors: (*Reactor materials, Processing).

For abstract, see N 20 19.

BMI-1771 **Field 18J, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING APRIL 1966,
by Donald D. Keller. 1 May 66, 33p
Contract W-7405-eng-92

Descriptors: (*Reactor materials, Scientific research).

For abstract, see N 20 20.

BMI-1774 **Field 18J, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING MAY 1966,
by Donald D. Keller. 1 Jun 66, 26p
Contract W-7405-eng-92

Descriptors: (*Reactor materials, Scientific research).

For abstract, see N 20 20.

BNWL-264 **Field 18J**
CFSTI Prices: HC$3.00 MF$0.75
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PRELIMINARY HYDRAULIC ANALYSIS OF THE CONCEPTUAL FFTF CERMET DRIVER FUEL ELEMENT DESIGN,
by G. J. Crandall. Jul 66, 68p
Contract AT (45-1)-1830

Descriptors: (*Reactor fuel elements, Design).

For abstract, see N 20 20.

N66-29329 **Field 18J**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
FEATURES OF CONTACT HEAT TRANSFER IN REACTOR FUEL ELEMENTS.
Osobennosti Kontaktnogo Teploobmena V Teplo-Vydelyayushchikh Elementakh Reaktora
by V. S. Miller. Apr 64, 9p NASA-TT-F-8849
Transl. Into English From Izv. Vyssh. Ucheb. Zaved., Energ. (Minsk), No. 3, 1962 P 67-70

Descriptors: *Fuel element, *Heat flux, *Metal surface, *Reactor fuel, *Thermoconductivity, Ceramic, Conduction, Contact, Core, Element, Flux, Fuel, Gaseous, Heat, Heat transfer, Jacket, Medium, Metal, Radiative, Reactor, Resistance, Surface, Thermal.

For abstract, see S 04 16.

N66-35688 **Field 18J**
CFSTI Prices HC$2.00 MF$0.50
General Electric Co., Cincinnati, Ohio. Space Power And Propulsion Section.
ADVANCED REFRACTORY ALLOY CORROSION LOOP PROGRAM QUARTERLY PROGRESS REPORT NO. 5, 15 APR. - 15 JUL. 1966.
by R. W. Harrison. 29 Jul 66, 31p NASA-CR-72057
Contract NAS3-6474

Descriptors: *Chemical analysis, *Extrusion, *Mechanical property, *Refractory alloy, Analysis, Chemical, Corrosion, Lithium, Loop, Mechanical, Metallography, Microhardness, Molybdenum, Niobium, Property, Spectrography.

For abstract, see S 04 21.

N66-35963 **Field 18J**
CFSTI Prices HC$5.69 MF$2.75
General Dynamics/fort Worth, Tex. Nuclear Aerospace Research Facility.
MEASURED EFFECTS OF THE VARIOUS COMBINATIONS OF NUCLEAR RADIATION, VACUUM, AND CRYOTEMPERATURES ON ENGINEERING MATERIALS FINAL BIENNIAL REPORT, 1 MAY 1964 - 1 MAY 1966.
by E. E. Kerlin, and E. T. Smith. 1 Jul 66, 520p
NASA-CR-77772, FZK-290
Contract NAS8-2450

Descriptors: *Cryogenic temperature, *Nuclear radiation, *Radiation effect, *Spacecraft construction material, *Vacuum effect, Adhesive, Coating, Construction, Cryogenic, Dielectric, Effect, Engineering, Insulation, Lubricant, Material, Nonmetallic, Nuclear, Radiation, Reactor, Seal, Spacecraft, Temperature, Thermal, Vacuum.

For abstract, see S 04 21.

ORNL-3951 **Field 18J, 11F, 18I, 18L**
CFSTI Prices: HC$6.00 MF$1.25
Oak Ridge National Lab., Tenn.
GAS-COOLED REACTOR PROGRAM SEMIANNUAL PROGRESS REPORT FOR THE PERIOD ENDING MARCH 31, 1966.
Jul 66, 244p
Contract W-7405-eng-26

Descriptors: (*Gas-cooled reactors, *Reactor materials).

For abstract, see N 20 19.

PB-173 239 **Field 18J**
CFSTI Prices: HC$6.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
CONTRIBUTION A L'ETUDE DES TEXTURES DE BARREAUX D'URANIUM MIS EN FORME PAR FRITTAGE-EXTRUSION ET LEURS CONSEQUENCES SUR LE COMPORTEMENT AU CYCLAGE THERMIQUE (Contribution to the Study of the Textures of Uranium Rods Prepared by Sintering - Extrusion, and Their Consequences on the Thermal Cycling Behaviour).
Doctoral thesis.
by Jose Peix. 24 Nov 64, 70p CEA-R-2972
Text in French; Attached summary in English.

Descriptors: (*Uranium, Reactor fuel processing), (*Reactor fuel rods, Phase studies), Sintering, Extrusion, Grain structures (Metallurgy), Thermal properties, Surface properties, X-ray diffraction analysis, Thermal expansion, France.

Uranium rods prepared by sintering-extrusion in the alpha or beta phase (at various extrusion ratios) using slightly oxidised powders were subjected to the thermal cycling test. At the same time, dilatometric and X-ray techniques made it possible to determine the structures produced in these materials during their fabrication. A relationship is then proposed linking the texture to the increase in length on thermal cycling. (Author)

RFP-741 **Field 18J, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
IMPROVED SERVICE LIFE OF 15-KG REDUCTION REACTOR VESSELS,
by L. L. Nelson. 6 Jun 66, 19p
Contract AT (29-1)-1106

Descriptors: (*Stainless steel, *Reactor system components).

For abstract, see N 20 19.

AD-639 748 **See Field 18H**

ANL-7120 **See Field 18L**

ANL-7174 **See Field 18D**

ANL-7219 **See Field 18I**

BNL-968 **See Field 7A**

BNL-973 **See Field 7A**

IDO-17190 **See Field 18I**

NAA-SR-11900 **See Field 18I**

PB-169 614 **See Field 7E**

PB-170 912 **See Field 7E**

PB-170 921 **See Field 11F**

WCAP-6080 **See Field 18I**

18K. REACTOR PHYSICS

AD-639 671 **Field 18K, 20H, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
A NOTE ON SUBROUTINE CEASE (05R:EVAP) A MODIFICATION OF EVAP IN 05R,

by E. A. Straker, and V. R. Cain. 31 Aug 66, 6p ORNL-TM-1552

Descriptors: (*Nuclear scattering, Programming (Computers)), (*Neutron scattering, Programming (Computers)), Nuclear reactions, Mathematical models, Nuclear energy levels, Probability.

The note concerns the use of the evaporation model for inelastic scattering in light nuclei. Also, modifications have been made to the 05R subroutine EVAP to provide better continuity in the scattered neutron energy distribution determined from level structure data and from the evaporation model. A selection technique for picking from the distribution is also given. (Author)

BNWL-283 **Field 18K**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
NEUTRONICS CHARACTERISTICS OF SELECTED COMPACT FAST REACTORS,
by W. W. Little Jr. and R. W. Hardie. Jul 66, 25p
Contract AT (45-1)-1830

Descriptors: (*Fast reactors, *Neutron transport theory).

For abstract, see N 20 20.

N66-27486 **Field 18K**
CFSTI Prices HC$3.00 MF$0.75
United Nuclear Corp., Elmsford, N. Y. Research And Engineering Center.
ATHENA - A SYSTEM OF FORTRAN PROGRAMS FOR RADIATION TRANSPORT AND HEATING CALCULATIONS IN COMPLEX REACTOR GEOMETRIES FINAL REPORT.
by D. Spielberg. Mar 66, 89p NASA-CR-54905, UNC-5148
Contract NAS3-6200

Descriptors: *Computer program, *Gamma radiation, *Neutron, *Radiation transfer, Computer, Core, Dimensional, Gamma, Heating, Input, Logic, Output, Program, Radiation, Reactor, Three, Transport.

For abstract, see S 04 15.

N66-27941 **Field 18K**
CFSTI Prices HC$2.00 MF$0.50
General Dynamics/fort Worth, Tex. Nuclear Aerospace Research Facility.
MONTE CARLO CALCULATIONS OF ENERGY DEPOSITIONS AND RADIATION TRANSPORT. VOLUME I - VALIDATION OF COHORT CODES.
by D. G. Collins, and T. W. De vries. 21 Dec 63, 31p NASA-CR-75629, FZK-176-1
Contract NAS8-5182

Descriptors: *Digital computer, *Heating, *Ibm 7090 computer, *Monte carlo method, *Propellant tank, *Radiation field, Code, Computer, Deposition, Digital, Energy, Environment, Field, Heat, Hydrogen, Liquid, Nerva, Neutron, Nuclear, Propellant, Radiation, Rocket, Stage, Tank.

For abstract, see S 04 15.

N66-35654 **Field 18K**
CFSTI Prices HC$3.25 MF$1.25
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
A FORTRAN IV TWO-DIMENSIONAL DISCRETE ANGULAR SEGMENTATION TRANSPORT PROGRAM.
by C. E. Barber. Aug 66, 190p NASA-TN-D-3573

Descriptors: *Angular distribution, *Computer program, *Difference equation, *Fortran, *Transport equation, Angular, Calculation, Computer, Convergence, Difference, Discrete, Distribution, Equation, Flux, Neutron, Program, Rate, Segment, Transport.

For abstract, see S 04 21.

PB-173 241 **Field 18K**
CFSTI Prices: HC$4.60 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
LE COEFFICIENT DE DIFFUSION EN FONCTION DE L'ENERGIE DES THERMALISEURS USUELS (The Diffusion Coefficient as a Function of Energy for Usual Moderators),
by Michel Cadilhac, Michel Livolant, Denise Pillard, and Jean-Louis Soule. Sep 66, 50p CEA-R-3010
Text in French; Attached summary in English.

Descriptors: (*Reactor moderators, *Neutron transport theory), Energy, Functions, Diffusion, Approximation (Mathematics), Mathematical models, France.

After recalling the definition of the energy function to be taken for the diffusion coefficient used in calculations of reactor cells, in the elementary theory of diffusion, various possible approximations are given of this function. These approximations are shown to be accurate enough for practical uses. Lastly are described methods for the direct computations of these approximations for the currently used 'normal' models (methods avoiding the calculation of differential cross-sections); these methods are applied to several usual moderators at various temperatures (according to different models). (Author)

AD-454 732 **See Field 20I**

ANL-7143 **See Field 18I**

NAA-SR-11900 **See Field 18I**

18L. REACTORS (POWER)

ANL-7120 **Field 18L, 18J**
CFSTI Prices: HC$9.25 MF$3.75
Argonne National Lab., Ill.
PROCEEDINGS OF THE CONFERENCE ON SAFETY, FUELS, AND CORE DESIGN IN LARGE FAST POWER REACTORS, ARGONNE NATIONAL LABORATORY, ILLINOIS, OCTOBER 11-14, 1965.
14 Oct 65, 925p
Contract W-31-109-eng-38
CONF-651009

Descriptors: (*Symposia, *Reactor system components).

For abstract, see N 20 20.

N66-27490 **Field 18L**
CFSTI Prices HC$6.00 MF$1.25
General Electric Co., Philadelphia, Pa. Missile And Space Div.
STUDY OF NUCLEAR BRAYTON CYCLE POWER SYSTEM.
by S. I. Freedman. 5 Aug 65, 225p NASA-CR-54397
Contract NASW-980
Its Doc.-65sd4251

Descriptors: *Brayton cycle, *Manned spacecraft, *Nuclear power plant, *Space probe, Cool, Exchanger, Gas, Heat, Liquid, Manned, Nuclear, Pipe, Plant, Power, Probe, Radiator, Reactor, Shield, Space, Spacecraft, Weight.

For abstract, see S 04 15.

BNL-959 **See Field 7A**

IDO-17190 **See Field 18I**

LA-3396 **See Field 6R**

ORNL-3951 **See Field 18J**

PB-173 181 **See Field 18I**

WCAP-6080 **See Field 18I**

18M. REACTORS (NON-POWER)

PB-173 348 **See Field 21F**

18N. SNAP TECHNOLOGY

N66-27526 **Field 18N**
CFSTI Prices HC$6.00 MF$1.25
Cook Electric Co., Morton Grove, Ill. Tech-center Div.
PROPERTIES OF RADIOISOTOPE HEAT SOURCES, PART I FINAL REPORT, 25 MAR. - 31 AUG. 1965.
by C. R. Memhardt. 1965, 203p NASA-CR-75439
Contract NAS5-9156

Descriptors: *Chemical property, *Isotope, *Physical property, *Snap program, Annotation, Auxiliary, Bibliography, Capacity, Chemical, Energy, Fission, Half-life, Heat, Neutron, Nuclear, Physical, Power, Program, Property, System.

For abstract, see S 04 15.

NAA-SR-6322 **See Field 21F**

19A. AMMUNITION, EXPLOSIVES, AND PYROTECHNICS

AD-460 363 **Field 19A**
CFSTI Price: HC$2.60
Ammunition Engineering Directorate, Picatinny Arsenal, Dover, N. J.
SAFETY HAZARD CLASSIFICATION OF WATER-WET EXPLOSIVES,
by Darrell Kite Jr. Feb 65, 27p
PA-TR-3223

Descriptors: (*Explosive materials, Safety), Hazards, Classification, RDX, HMX, Plastic explosives, Costs, Detonations.

Identifiers: Water-wet explosives, Composition C-4, Composition A-3.

Eighteen water-wet explosives were studied to determine whether they could support detonations. Of the 18 explosives tested, 15 sustained detonations when saturated with water. All explosives tested were found to sustain detonations at water levels that could be encountered in manufacturing operations following the filtering operation. Therefore, the filtered explosives should be assigned a safety hazard classification of class 9. (Author)

AD-640 331 **Field 19A**
CFSTI Prices: HC$2.00 MF$0.50
Smith (E. H.) and Co., Inc., Silver Spring, Md.
EED INSTRUMENTATION,
by E. H. Smith. Jul 66, 49p

Descriptors: (*Explosives initiators, Instrumentation), Probes (Electromagnetic), Radiofrequency, Test equipment, Electric currents, Thermocouples, Heat transfer, Bolometers, Photoelectric cells (Semiconductor), Pressure gages, Diodes (Semiconductor), Galvanometers.

The report is a study of the various possible means of EED current measurement. Of all the devices studied, the use of an rf probe and associated optoelectronic device to get the signal out of the weapons case looks the most promising for future developmental effort.

PB-170 990 **See Field 21I**

19C. COMBAT VEHICLES

AD-640 155 **See Field 5E**

19D. EXPLOSIONS, BALLISTICS, AND ARMOR

AD-639 735 **Field 19D, 21B**
CFSTI Prices: HC$2.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
THE THEORY OF DETONATION, THE COMBUSTION MECHANISM, AND THE PROPERTIES OF EXPLOSIVES: COMPILATION OF ABSTRACTS.
Rept. no. 5 on ATD work assignment no. 70,
by Seraphim Parandjuk. 21 Sep 66, 36p ATD-66-44
TT-66-62370
Report based on Soviet open literature. Rept. on Surveys of Foreign Scientific and Technical Literature.

Descriptors: (*Detonations, Explosive materials), (*Explosive materials, *Combustion), USSR, Abstracts, Theory, Explosions, Shock waves, Ignition, Gas flow, Propellants.

A compilation of abstracts is based on Soviet open sources published in 1965, together with one Satellite source published in 1965 and one Soviet source published in 1966. This is the fourth report in this series dealing with the theory of combustion, the combustion mechanism, and the properties of explosives. There are 36 abstracts and no bibliography. Other information included: combustion zone, flame combustion, propellant oxidizer, thermal explosion, investigation of phase transitions sodium and potassium nitrates by means of Raman scattering spectra, blasting energy, gaseous and liquid explosives, nonsteady-state powder combustion, ignition of homogenous explosive particles in hot gas, ballistite burning, metastable substance, detonation process, metal fuel. (Author)

AD-639 960 **Field 19D, 4A**
CFSTI Prices: HC$1.00 MF$0.50
Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
PROJECTILE DISPERSION AS CAUSED BY BARREL DISPLACEMENT IN THE 5-INCH GUN PROBE SYSTEM,
by Eugene L. McCluney. Jul 66, 22p
Task IV014501B53A-10
ECOM-5060

Descriptors: (*Probes, Atmospheric sounding), (*Ballistics, Guns), Projectiles, Gun barrels, Scattering, Graphics, Mathematical analysis.

The dispersion of theoretical ranges and firing azimuths due to lateral displacements in the barrel of the 5-inch gun probe system is analyzed. Computations were based on increments of tilt and azimuth displacements and for several nominal tilt angles. A nominal gross launch weight of 20 pounds and muzzle velocity of 5000 feet per second were used in the calculations for a 4000-foot MSL launch elevation. The theory is discussed, and graphs are presented detailing the theoretical effects of barrel displacements on ranges and firing azimuths. (Author)

AD-640 137 **Field 19D, 21B**
CFSTI Prices: HC$1.00 MF$0.50
Cavendish Lab., Cambridge Univ. (England).
GROWTH OF BURNING TO DETONATION IN LIQUIDS AND SOLIDS,
by F. P. Bowden. May 65, 5p Scientific-6
Grant AF-EOAR-18-64
AFOSR-65-1774
See also AD-640 138.

Descriptors: (*Explosions, Photographic analysis), (*Combustion, Explosive materials), (*Detonations, Photographic analysis), (*Fragmentation, Explosions), Great Britain, Liquids, Solids, Single crystals, Fracture (Mechanics), Theory, High-speed photography.

Studies were made of the growth of burning to explosion in a homogeneous thin film of nitroglycerine (about 0.1mm thick and 3 cm in diameter) which is confined between two solid discs and initiated at its centre by an electric spark. Reaction grows from the initiation site first as an accelerating burning, which advances into a region of bubble-free liquid that is under high pressure generated by the central burning. Standard shocks were applied to single crystals of P.E.T.N., R.D.X., H.M.X., and silver azide by explosive detonators separated by thin baffles from the crystals under study. The processes leading to fragmentation, deflagration and detonation have been followed at microsecond framing rates using a Beckman and Whitley high-speed camera. The shock strengths were found either by using piezocrystals or by measuring separately shock velocities in water or lucite. Research on the fracture of inert crystals was made. Fracture was followed both by high-speed photography, and an ultrasonic technique. The fracture work was with magnesium oxide and lithium fluoride. The maximum velocities of cleavage in all these materials have been recorded; this is of theoretical interest. The appearance of a fracture surface varies markedly along its course. Factors which affect the surface markings include the dislocation density of the material, the velocity of fracture and stress waves. The theoretical work was concerned with studies of the explosion process from the viewpoint of thermal explosion theory.

AD-640 138 **Field 19D, 21B**
CFSTI Prices: HC$1.00 MF$0.50
Cavendish Lab., Cambridge Univ. (England).
GROWTH OF BURNING TO DETONATION IN LIQUIDS AND SOLIDS,
by F. P. Bowden. Aug 65, 6p Scientific-7
Grant AF-EOAR-18-64
AFOSR-65-1269
See also AD-628 915.

Descriptors: (*Explosions, Photographic analysis), (*Combustion, Explosive materials), (*Detonations, Photographic analysis), (*Fragmentation, Explosions), Great Britain, Liquids, Solids, Single crystals, Fracture (Mechanics), Theory, High-speed photography.

Studies were made of the growth of reaction from initiation through burning to explosion in a homogeneous thin film of nitroglycerine which is enclosed between two flat solid surfaces and initiated at its centre by an electric spark. Standard shocks were applied to single crystals of P.E.T.N., R.D.X., H.M.X., silver azide, silver, mercury and potassium fulminates and polymeric S4N4 by explosive detonators separated by thin baffles from the crystals under study. The processes leading to fragmentation, deflagration and detonation have been followed at microsecond framing rates using a Beckman and Whitley high-speed camera. The shock strengths were found either by using piezocrystals or by measuring separately shock velocities in water or lucite. The study so far has shown the importance of habit imperfections in determining the sites at which deflagration starts. The imperfections, which may be either crystallographic notches or steps, are to some extent controllable. A problem of some interest in fracture mechanics concerns the branching of cracks. There appear to be two distinct mechanisms, the one depends on the velocity at which a crack is travelling through a solid and the other on stress wave interaction with the crack. The theoretical work was concerned with studies of the explosion process from the viewpoint of thermal explosion theory. It covers initiation by hot spots of various geometries corresponding to initiation by light, hot wires, plates and spheres and the arrival of shock wave at an impedance discontinuity.

AD-640 139 **Field 19D, 21B**
CFSTI Prices: HC$1.00 MF$0.50
Cavendish Lab., Cambridge Univ. (England).
GROWTH OF BURNING TO DETONATION IN LIQUIDS AND SOLIDS,
by F. P. Bowden. Dec 64, 6p Scientific-1
Grant AF-EOAR-18-64
AFOSR-65-0696
See also AD-640 137.

Descriptors: (*Explosions, Photographic analysis), (*Combustion, Explosive materials), (*Detonations, Photographic analysis), (*Fragmentation, Explosions), Great Britain, Liquids, Solids, Single crystals, Fracture (Mechanics), Theory, High-speed photography.

Explosion in nitroglycerine by impact was recorded using a high-speed C sub 4 framing camera. The introduction of inhomogeneities favours the formation of localised concentrations of energy in the form of hot spots, at which chemical reaction can be initiated. In the early stages the chemical reaction propagates as an accelerating fast burning at up to several hundreds of metres per second. It appears that certain conditions (e.g. turbulence and the formation of a mixture of liquid droplets, unreacted nitroglycerine vapour and hot gaseous products) are essential for subsequent transition from this regime to a more violent explosion. The study of fracture propagation was concentrated on single crystals of magnesium oxide, using high-speed photography (Beckman and Whitley) and independently an ultrasonic method. High-speed photographic records using a Beckman and Whitley camera were made of the deflagration and detonation of single crystals of P.E.T.N., R.D.X., H.M.X., and silver azide. New theories of initiation of explosion by light and of the growth and decay of hot-spots in condensed explosives were developed.

AD-640 256 **Field 19D, 20D, 22A**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
MOVEMENT OF THE TWO PARTS AFTER THE BURSTING APART OF A VOLUME WITH GAS IN A VACUUM,
by G. L. Grodzovskii, and F. A. Kukanov. 30 Mar 66, 13p FTD-TT-65-1675
TT-66-62420
Unedited rough draft trans. of Dvizhenie Dvukh Chastei Posle Razryva Obema s Gazom v Vakuume, N. P. 1965 11p.

Descriptors: (*Containers, Fragmentation), (*Fragmentation, Equations), Gas flow, Vacuum, Partial differential equations, Structural shells, Boundary layer.

A solution is given to the problem of the movement, in a forceless field, of the two parts formed from a gas-filled container which has burst in a vacuum environment.

AD-640 525 **Field 19D, 7D, 12A**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
CALCULATION OF PARAMETERS OF A DETONATION WAVE OF CONDENSED EXPLOSIVES.
by A. Ya. Apin, and I. M. Voskoboinikov. 1960, 6p Translation-2083
TT-66-62467
Raschet Parametrov Detonatsionnoi Volni v Kondensirovannykh Vzryvchatykh Veshchestvakh. Trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n4 p54-5 1960.

Descriptors: (*Detonation waves, *Explosive materials), Mathematical analysis, USSR.

PNE-515 **Field 19D, 8M, 18C**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
SUBSURFACE EFFECTS MEASUREMENTS PROJECT PRE-SCHOONER II.

Final rept.,
by Myron Heusinkveld, and Robert Marks. Jan 66, 41p
Contract W-7405-eng-48

Descriptors: (*Cratering, *Soil mechanics).

For abstract, see N 20 19.

AD-423 446 See Field 20K

AD-639 717 See Field 14B

AD-640 145 See Field 7A

AD-640 203 See Field 14B

AD-640 451 See Field 8L

19F. GUNS

AD-481 076 Field 19F
CFSTI Prices: HC$2.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
THE DEVELOPMENT OF A SMOOTH BORE GUN FOR THE PROJECTION OF BIRD CARCASSES.
by D. A. Perfect. Jan 66, 49p TR-66008

Descriptors: (*Guns, Impact tests), (*Impact tests, Aircraft), (*Windshields, Birds), Simulation, Impact shock, Projectiles, Design, Penetration, Equations of motion, Compressed air.

A smooth bore gun apparatus has been designed and developed for the projection of bird carcasses of up to 4 lb weight of stationary targets. The apparatus is intended to provide basic information, and also to provide a testing facility, for the design of aircraft windscreens capable of withstanding the impact of birds during flight. Full details are given of the design basis of the gun and its associated equipment, and of its present performance. (Author)

19G. ROCKETS

AD-640 290 See Field 51

N66-35684 See Field 4A

20. PHYSICS

N66-28035 Field 20
CFSTI Prices HC$6.00 MF$1.50
Virginia Univ., Charlottesville.
KINEMATIC TRANSFORMATIONS OF SEVERAL MECHANISMS.
by D. W. Lewis. Jun 66, 257p NASA-CR-512
Grant NSG-682

Descriptors: *Graph, *Kinematics, *Mechanism, Design, Device, Engineering, Gear, Input, Link, Mechanical, Motion, Output, Transformation.

For abstract, see S 04 15.

20A. ACOUSTICS

AD-463 491 Field 20A, 17A
CFSTI Price: HC$2.60
Navy Marine Engineering Lab., Annapolis, Md.
THE DEVELOPMENT OF AN ACOUSTIC IMPEDANCE MEASURING INSTRUMENTATION SYSTEM FOR USE INSIDE A PIPING SYSTEM.
Phase rept.,
by Louis T. Ho. Apr 65, 23p MEL-83/65
Proj. SF013-11-09
Task 03963

Descriptors: (*Submarine noise, Acoustic impedance), (*Acoustic insulation, Antisubmarine warfare), (*Antisubmarine warfare, Submarine noise), Acoustics, Acoustic filters, Effectiveness, Pipes, Submarine, Ships, Measurement, Instrumentation, Mathematical analysis, Hydrophones, Accelerometers, Pressure, Propagation, Theory.

A miniature, probe-type device for measuring the acoustic impedance inside a piping system would be a useful tool for experimental study of sound propagation within the system and mechanism of acoustic energy transfer between fluid and pipe walls. The best approach for the design of such a device would be the theory that the instantaneous sum and difference of acoustic pressures at two points separated by a small distance are proportional, respectively, to the pressure and particle velocity at the center of separation. The extent of progress is presented in the development of an acoustic impedance measurement system, based on such a theory. (Author)

AD-465 678 Field 20A
CFSTI Prices: HC$9.40 MF$2.75
Michigan Univ., Ann Arbor. Inst. of Science and Technology.
PROPAGATION OF SOUND IN AIR. A BIBLIOGRAPHY WITH ABSTRACTS.
by John W. Wescott, and S. Steven Kushner. Jun 65, 636p 2900-185-B
Contracts DA-36-039-sc-52654, DA-36-039-sc-78801
Proj. DA-3D5801001
Rept. on Proj. Michigan.

Descriptors: (*Sound transmission, *Bibliographies), Sound, Propagation, Abstracting, Indexes, Theory, Shock waves, Acoustics, Acoustic properties, Absorption, Acoustic equipment, Echo ranging, Instrumentation, Meteorological parameters, Atmospheric pressure, Transducers, Velocity, Ultrasonic radiation.

Identifiers: MICHIGAN Project.

The bibliography contains several thousand abstracts from the unclassified literature on the propagation of sound in air. The subject is treated in depth for the years 1929 to 1963. Some abstracts on earlier works of lasting interest and many abstracts from English translations of foreign journals are included. The abstracts are grouped according to subject matter. Subject and author indexes are furnished. Accessions Document (AD and earlier ATI) numbers used by both the Defense Documentation Center (formerly ASTIA) and the Office of Technical Services (OTS) are furnished wherever possible. (U)

AD-639 887 Field 20A
Not available from CFSTI.
National Magnet Lab., Mass. Inst. of Tech., Cambridge.
MAGNETOACOUSTIC ATTENUATION IN LIQUID MERCURY,
by Y. Shapira. 2 Mar 66, 5p
Contract AF 49 (638)-1468
Proj. AF-9764
AFOSR-66-1309
Availability: Published in Physics Letters v20 n6 p604-6 Apr 1966.

Descriptors: (*Sound, Attenuation), High frequency, Liquid metals, Mercury, Magnetic fields, Magnetohydrodynamics.

Identifiers: Magnetoacoustics.

The attenuation of 6 and 18 Mc/sec sound waves propagating in liquid mercury was measured in d. c. magnetic fields up to 145 kG. The results are in very good agreement with Anderson's theory. (Author)

AD-639 945 Field 20A, 8L
CFSTI Prices: HC$1.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J.
EXCITATION OF FLEXURAL WAVES IN LAKE ICE WITH 80-Hz RESONANT SEISMIC TRANSDUCERS.
Technical rept.,
by William Kennebeck. Jul 66, 21p ECOM-2735
Proj. DA-1PO-14501-B31A-00-43

Descriptors: (*Ice, *Propagation), Lakes, Superlow frequency, Propagation, Sound transmission.

A description is given of steady-state flexural wave propagation experiments conducted on the ice cover of Lake George, N. Y., using portable 80-Hz/10-W max seismic transducers as transmitters and receivers. Measured flexural wave propagations and signal characteristics are analyzed with regard to acoustical communications through lake ice. (Author)

N66-27064 Field 20A
CFSTI Prices HC$2.00 MF$0.50
Toronto Univ. (Ontario).
REFRACTION OF SOUND BY JET FLOW OR JET TEMPERATURE.
by J. Atvars, E. Grande, H. S. Ribner, and L. K. Schubert. May 66, 34p NASA-CR-494, AIAA PAPER-65-82
Grant NSG-661, Contract AF-AFOSR-223-64
Revised Ed. Of Aiaa Paper-65-82

Descriptors: *Jet flow, *Refraction, *Sound field, Axis, Coupling, Direction, Driver, Field, Flow, Frequency, Jet, Noise, Pattern, Sound, Source, Supersonic, Temperature, Tube, Velocity.

For abstract, see S 04 15.

N66-27759 Field 20A
CFSTI Prices HC$2.00 MF$0.50
Rocketdyne, Canoga Park, Calif.
PUMP DISCHARGE OSCILLATION STUDY QUARTERLY PROGRESS REPORT, 1 JAN. - 31 MAR. 1966.
by E. Jackson. 13 Apr 66, 43p NASA-CR-75412, TAMM-6115-22
Contract NAS8-20143

Descriptors: *Pressure oscillation, *Test program, *Wave generation, Acoustic, Anemometer, Blade, Cavitation, Diffuser, Discharge, Elbow, Generation, Hot, Orifice, Oscillation, Pipe, Pressure, Program, Pump, Test, Transmission, Wake, Wave, Wire.

For abstract, see S 04 15.

N66-29326 Field 20A
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
ATMOSPHERIC EFFECTS ON SONIC-BOOM SIGNATURES.
by H. H. Hubbard, and D. J. Maglieri. 1965, 12p NASA-TM-X-56436
Presented At The 5th Intern. Congr. On Acoustics, Liege, 7-14 Sep. 1965

Descriptors: *Atmospheric refraction, *Sonic boom, *Turbulent mixing, Atmospheric, Boom, Grazing, Ground, Impingement, Incidence, Interaction, Mixing, Pressure, Refraction, Signature, Sonic, Supersonic, Turbulent, Wave.

For abstract, see S 04 16.

PB-170 867 Field 20A
CFSTI Prices: HC$1.00 MF$0.50
Polytechnic Inst. of Brooklyn, N. Y. Dept. of Aerospace Engineering and Applied Mechanics.
DIFFRACTION BY A TRANSPARENT ELLIPTICAL CYLINDER,
by Lawrence D. Porter. Feb 66, 19p PIBAL-874

Descriptors: (*Acoustics, Cylindrical bodies), Boundary value problems, Wave transmission, Special functions, Diffraction.

The diffraction of an acoustic pulse from a line source by a transparent elliptical cylinder is treated as a formal boundary-value problem. The solutions interior and exterior to the cylinder are represented in terms of eigenfunction expansions of Mathieu functions. Perturbation theory is used to eliminate the difficulty arising from the absence of an orthogonality relation between the angular functions for the interior and exterior regions of the cylinder. A general asymptotic expression valid for short times after the arrival of the wave front is given for the reflected, transmitted, and diffracted pulses. (Author)

PB-173 077 **Field 20A**
CFSTI Prices: HC$1.10 MF$0.50
Columbia Univ., N. Y. Dept. of Electrical Engineering.
RESPONSE OF SPECTRUM ANALYZERS OF THE BANK-OF-FILTERS TYPE TO SIGNALS GENERATED BY VOWEL SOUNDS,
by Cyril M. Harris, and William M. Waite. 21 Aug 63, 7p
NSF Scientific Documentation Project. Prepared for presentation at the Meeting of the Acoustical Society of America (65th), 15-18 May 1963. The Journal of the Acoustical Society of America v35 n12 p1972-7 Dec 1963.

Descriptors: (*Spectrum analyzers, *Sound signals), Digital computers, Simulation, Acoustic filters, Frequency analyzers.

Identifiers: FORTRAN II, Vowels.

The paper describes a study that has been made of a comparison of the response of spectrum analyzers of the bank-of-filters type to signals generated by steady-state vowel sounds. Each analyzer is comprised of a bank of one of the following types of filters: single-tuned, cascaded single-tuned, double-tuned, cascaded double-tuned, Butterworth, and Gaussian. Both constant-bandwidth and constant-mel-bandwidth analyzers were investigated. The response characteristics of these analyzers were obtained both with and without frequency equalization. A comparison was made of constant-bandwidth analyzers having bandwidths of 70, 140, and 280 cps. In this investigation, the bank of filters and the input signals to the analyzers were synthesized on a digital computer. (Author)

AD-639 628 **See Field 5J**

AD-639 686 **See Field 6P**

AD-640 032 **See Field 20E**

AD-640 086 **See Field 5J**

AD-640 149 **See Field 20E**

AD-640 241 **See Field 20D**

AD-640 378 **See Field 17B**

PB-170 960 **See Field 14B**

20B. CRYSTALLOGRAPHY

AD-639 777 **Field 20B, 20J**
Not available from CFSTI.
Johns Hopkins Univ., Baltimore, Md.
PARTICLE WAVES AND AUDIOFREQUENCY MODES IN CRYSTALS,
by Edwin R. Fitzgerald. 1964, 15p
Research supported in part by ONR.
Availability: Published in The Journal of Acoustical Society of America v39 n5 pt1 p856-69 May 1966.

Descriptors: (*Crystals, *Quantum mechanics), Deformation, Propagation, Crystal lattices, Audiofrequency, Differential equations, Sound, Resonance.

Starting with the idea that wave mechanics should be useful in dealing with mechanical properties of solids, a connection between particle waves and deformation in crystals is developed. The connection is one in which Planck's constant h plays a prominent part. According to the view described, nonelastic deformation in crystals arises through the propagation of internally generated particle momentum waves with the de Broglie wavelength lambda = h/mv sub i. Here, m and v sub i are the mass and velocity, respectively, of certain, initially field-free atoms that exist because of lattice defects in the crystal. The particle waves in question are not the probability waves of contemporary, orthodox quantum theory which satisfy the Schrodinger equation. Instead, real-property waves governed by a new differential equation are proposed. Solutions to this equation for both finite and infinite lattices lead to frequency-wave vector conditions from which a number of interesting results follow. These include the occurrence of characteristic frequencies or modes associated with nonelastic deformation, and, in particular, the existence of discrete audiofrequency modes whose frequencies depend on Planck's constant, atomic mass, and lattice segment length. The particle-wave view thus leads directly to predictions of nonelastic audiofrequency resonances in vibration experiments and to expectations of acoustic emission during unidirectional plastic deformation. Applications of these same ideas to other aspects of mechanical behavior are also described briefly. (Author)

AD-639 844 **Field 20B**
Not available from CFSTI.
Milan Univ. (Italy). Istituto di Fisica.
DIELECTRIC RELAXATION CHANGES DUE TO OPTICAL CONVERSION OF F CENTERS TO Z SUB 1 CENTERS IN KCl:SrCl2 CRYSTALS,
by C. Bucci, R. Cappelletti, and L. Pirola. 20 Sep 65, 7p
Grant AF-EOAR-07-65
Proj. AF-9761
Task 976103
AFOSR-66-1663
Availability: Published in The Physical Review v143 n2 p619-23 11 Mar 66.

Descriptors: (*Single crystals, Salts), (*Color centers, Crystal lattice defects), Absorption, Dielectric properties, Relaxation time, Solid solutions, Light, Potassium compounds, Chlorides, Strontium compounds, Absorption spectrum.

Optical-absorption and dielectric-loss measurements have been carried out and correlated in additively colored KCl:SrCl2 single crystals, in order to discern whether the impurity-vacancy dipolar complexes are involved in the optical conversion of F centers to Z sub 1 centers. The Z sub 1 centers were created by irradiating samples containing only F centers at 40C by means of high-intensity light absorbed by the F band; a concentration of approximately or equal to 10 to the 17th power Z sub 1 centers was obtained in about 30 sec. In the meantime the concentration of impurity-vacancy complexes n1V was measured by means of dielectric losses. The results show that n1V is not instantaneously affected by the growth of Z sub 1 centers but rather decreases slowly thereafter in a time of about 20 min after the F-light illumination. The total change of n1V was approximately 10% of the initial value approximately or equal to 10 to the 18th power dipole/cu cm., i.e., approximately or equal to 10 to the 17th power dipoles. Similar measurements have been carried out by irradiating at 0C and by determining n1V by measuring the discharge of the induced polarization at increasing temperature (method of the ionic thermoconductivity); the results obtained thus are consistent with the ones at 40C. This experiment rules out the possibility that the impurity-vacancy dipoles take part directly in the Z sub 1-center formation; the proposed models are discussed in view of these results. (Author)

AD-639 885 **Field 20B, 20F**
Not available from CFSTI.
Hughes Research Labs., Malibu, Calif.
TIME-RESOLVED INTERFEROMETRY IN STIMULATED BRILLOUIN SCATTERING,
by Concetto R. Giuliano. 11 Oct 65, 5p
Contract AF 49 (638)-1439
Proj. AF-9768
Task 976802
AFOSR-66-0544
Availability: Published in Applied Physics Letters v7 n10 p279-81 Nov 15 1965.

Descriptors: (*Brillouin zones, *Quartz), (*Interferometers, Brillouin zones), Simulation, Optical instruments, Lasers.

Identifiers: Fabry-Perot interferometers.

AD-639 901 **Field 20B, 11F**
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
LOW-ENERGY ELECTRON-DIFFRACTION STUDY OF MOLYBDENUM (110) SURFACES,
by T. W. Haas, and A. G. Jackson. 24 Nov 65, 7p ARL-66-0132
Proj. AF-7023
Prepared in cooperation with Systems Research Labs., Dayton, Ohio.
Availability: Published in Journal of Chemical Physics v44 n8 p2921-5 15 Apr 1966.

Descriptors: (*Molybdenum, Electron diffraction analysis), (*Crystal structure, Molybdenum), Surfaces, Oxygen, Nitrogen, Hydrogen, Absorption (Physical).

A study of the clean and oxygen-covered molybdenum (110) surface has been carried out using low-energy electron-diffraction techniques. The clean surface is found to be the same as an ideal (110) plane in the bulk. Oxygen structures corresponding to 1/4, 1/2, and 3/4 monolayer have been found. These structures are very similar to those found for the tungsten (110) surface. Experiments on nitrogen and hydrogen adsorption are inconclusive due to interference from other residual gases (primarily carbon monoxide). (Author)

AD-640 000 **Field 20B**
Not available from CFSTI.
Michigan Univ., Ann Arbor. Dept. of Chemical and Metallurgical Engineering.
PLANE-STRAIN COMPRESSION OF ALUMINUM CRYSTALS,
by W. F. Hosford Jr. 22 Jul 65, 11p
Contract DA-31-124-ARO (D)-321
AROD-5407:1
Availability: Published in Acta Metallurgica v14 p1085-94 Sep 66.

Descriptors: (*Single crystals, Aluminum), (*Aluminum, Deformation), Crystals, Compressive properties, Crystal structure, Stresses, Strain (Mechanics).

A plane-strain compression test was used to investigate the work-hardening of aluminum crystals deforming by multiple slip. Shear stress-strain curves were constructed from the compression data with an analysis of Bishop and Hill. The curves fall in a narrow band, indicating that, under conditions of multiple slip, the basic shear stress for slip depends primarily on the amount of prior slip, and that the combination of active slip systems is of much less importance. This observation supports a basic assumption in several theories of polycrystalline flow. Lattice rotation during plane-strain compression are reported and compared with similar observations during rolling. (Author)

AD-640 177 **Field 20B, 14B**
CFSTI Prices: HC$3.00 MF$0.50
Lexington Labs., Inc., Cambridge, Mass.
RUBIES FOR REFERENCE TEMPERATURE STANDARDS.

Final rept., 7 Apr 65-6 Apr 66,
by Philip S. Schaffer. Sep 66, 53p
Contract AF 30 (602)-3745
Proj. AF-8503
RADC-TR-66-456

Descriptors: (*Crystal growth, Single crystals), (*Ruby, Crystal growth), (*Sapphires, Crystal growth), Impurities, Chromium, Corundum, Doping, Crystal lattice defects, Temperature, Standards.

The vapor-phase growth technique was further developed for the growth of sapphire and ruby single crystals. Impurity content below 3 ppm was attained. Electron-microprobe technique was improved and used to demonstrate chromium doping uniformity of plus or minus 5ppm. (Author)

AD-640 178 **Field 20B, 7C**
Not available from CFSTI.
Georgia Inst. of Tech., Atlanta. School of Chemistry.
THE CRYSTAL AND MOLECULAR STRUCTURE OF METHYL PINACOL PHOSPHATE,
by M. Gary Newton, J. R. Cox Jr, and J. A. Bertrand. 5 Oct 65, 7p
Grant AF-AFOSR-62-163
Proj. AF-9762
Task 976202
AFOSR-66-1630
Availability: Published in Journal of the American Chemical Society v88 p1503-6 1966.

Descriptors: (*Organic phosphorus compounds, Crystal structure), (*P-heterocyclic compounds, Molecular structure), X-ray diffraction analysis, Crystal lattices, Least squares method, Molecular orbitals, Stereochemistry, Phosphates.

Identifiers: Methyl pinacol phosphates.

Methyl pinacol phosphate crystallizes in the space group P2 (1)2 (1)2 (1) with cell dimensions a = 9.48, b = 13.29, and c = 7.70 A. A three-dimensional, least-squares refinement with isotropic temperature factors resulted in an R factor of 9% for 729 X-ray intensities. The ring portion of the molecule is very similar to the ring portion of methyl ethylene phosphate, but the methyl ester group is rotated approximately 180 degrees from its position in methyl ethylene phosphate. The position of the methyl ester group is discussed in terms of pi bonding; the relationship between symmetry and pi bonding in phosphate esters is also discussed. (Author)

AD-640 185 **Field 20B, 20L**
Not available from CFSTI.
Rutgers - The State Univ., New Brunswick, N. J. Dept. of Physics.
CALCULATION OF THETA SUBSCRIPT 0 SUPERSCRIPT C DIFFERENCES FOR THE FACE-CENTERED CUBIC AND CLOSE-PACKED HEXAGONAL LATTICES IN THE IDEAL INERT GAS SOLIDS.
Revised ed.,
by C. Feldman. 25 May 65, 10p
Grant AF-AFOSR-62-167
Proj. AF-9761
Task 976101
AFOSR-66-1666
Revision of manuscript submitted 17 Nov 64.
Availability: Published in Proceedings of the Physical Society v86 p865-71 1965.

Descriptors: (*Helium group gases, Thermal properties), (*Crystal lattices, Helium group gases), Crystal structure, Solidified gases, Specific heat, Neon, Argon, Krypton, Xenon, Cryogenics, Mathematical models.

Theta subscript 0 superscript C (cph) and the ratio K defined as 100 (theta sub 0 superscript C (cph)-theta sub 0 superscript C (fcc))/theta sub 0 superscript C (fcc) for the ideal inert gas solids was calculated, using the quasi-harmonic approximation and an (m-6) Lennard-Jones all-neighbour force model; K was found to be about 2%. The neglect of explicit anharmonic contributions to K is discussed. A table of the relevant all-neighbour sums is given. It was found that the use of the ideal axial ratio gamma sub I = square root of (8/3) to characterize the close-packed hexagonal lattice limits the accuracy to which K can be calculated to about one decimal place, and theta sub 0 superscript C (cph) to about two decimal places. (Author)

AD-640 190 **Field 20B, 20L**
Not available from CFSTI.
Rochester Univ., N. Y. Dept. of Physics and Astronomy.
APPLICATION OF HOUSTON'S METHOD TO THE SUM OF PLANE WAVES OVER THE BRILLOUIN ZONE. I. SIMPLE-CUBIC AND FACE-CENTERED-CUBIC LATTICES,
by Maria Miasek. 22 Apr 65, 11p
Grant AF-AFOSR-62-145
Proj. AF-9761
Task 976101
AFOSR-66-1743
Availability: Published in Journal of Mathematical Physics v7 n1 p139-47 Jan 1966.

Descriptors: (*Brillouin zones, *Crystal lattices), (*Approximation (Mathematics), Crystal lattices), Distribution functions, Series.

AD-640 192 **Field 20B, 7B**
Not available from CFSTI.
Texas Univ., Austin. Dept. of Chemical Engineering.
THE STRUCTURE REFINEMENT OF La2Te3, a Th3P4 TYPE STRUCTURE,
by W. L. Cox, H. Steinfink, and W. F. Bradley.
30 Jul 65, 3p
Grant AF-AFOSR-62-237
Proj. AF-9761
Task 976101
AFOSR-66-1624
Availability: Published in Inorganic Chemistry v5 p318-9 1966.

Descriptors: (*Lanthanum compounds, Crystal structure), (*Tellurides, Crystal structure), Crystal lattices, Chemical bonds, X-ray diffraction analysis.

Identifiers: Lanthanum tellurides.

The crystal structure of La2Te3 was refined and the single variable parameter, x, was found to have the value 0.0748, as compared to the idealized value of 0.083. The bond distances and coordination polyhedra in this structure are discussed. (Author)

AD-640 280 **Field 20B, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Midwest Research Inst., Kansas City, Mo.
THE EFFECT OF OXIDE FILMS ON DISLOCATION-SURFACE INTERACTIONS IN ALUMINUM.
Technical rept. 15 Aug 65-14 Aug 66,
by J. C. Grosskreutz, and C. Q. Bowles. 14 Aug 66, 35p
Contract Nonr-3908 (00)
Proj. MRL-RA-14-P
See also AD-605 851.

Descriptors: (*Films, Crystal lattice defects), (*Oxides, Films), (*Aluminum, Deformation), Single crystals, Mechanical properties, Surface properties.

Aluminum single crystals were deformed in cyclic strain, both in air and in vacuum, and with both 50 and 100A thick oxide films on the surface. The results show that deformation in vacuum produces a layer of edge dislocation dipoles trapped just beneath the surface as well as reducing the amount of surface slip. The effect of increasing the oxide coating thickness is to reduce the amount of slip observable on the surface of the oxide. As an aid in interpretation, the mechanical properties of thin, amorphous aluminum oxide films were measured in air and in vacuum. Young's modulus, E sub c, was found to increase by a factor of 4 under vacuum, and the fracture strength by a factor of 1.5. These increases are most likely due to the removal of absorbed water vapor. The increase in E sub c can account for the presence of the trapped dislocation dipoles under vacuum by using the theory of Head and Conners which predicts a net repulsive force on near-surface dislocations when the modulus of the coating is greater than the modulus of the substrate. The reduction in surface slip observed under vacuum is due to the increase in both E sub c and the strength properties of the oxide coating. (Author)

LA-3510 **Field 20B, 20L**
CFSTI Prices: HC$5.00 MF$1.00
Los Alamos Scientific Lab., N. Mex.
DYNAMICS OF DISORDERED HARMONIC LATTICES,
by Daniel N. Payton III. May 66, 166p
Contract W-7405-eng-36

Descriptors: (*Crystal lattices, *Dynamics).

For abstract, see N 20 20.

N66-27951 **Field 20B**
CFSTI Prices HC$1.00 MF$0.50
Stanford Univ., Calif. Dept. Of Materials Science.
MECHANICAL BEHAVIOR OF POLYCRYSTALLINE NON- METALLICS AT ELEVATED TEMPERATURE PROGRESS REPORT, 1 OCT. 1965 - 31 MAR. 1966.
by P. Burke, and O. D. Sherby. 1966, 15p
NASA-CR-75642
Contract NGR-05-020-084

Descriptors: *Creep analysis, *Mechanical property, *Polycrystal, *Stress distribution, Analysis, Chloride, Compression, Creep, Dead, Distribution, Equation, Extrusion, Glide, Grain, High temperature, Load, Log, Material, Mechanical, Nonmetallic, Property, Sodium, State, Steady, Stress, Testing.

For abstract, see S 04 15.

AD-453 323 **See Field 11F**

AD-639 663 **See Field 11F**

AD-639 726 **See Field 11B**

AD-639 738 **See Field 20C**

AD-639 856 **See Field 11B**

AD-639 904 **See Field 20L**

AD-640 257 **See Field 20L**

AD-640 317 **See Field 20L**

AD-640 424 **See Field 20L**

NBS-Mono-25-Sec-4 **See Field 7D**

PB-170 921 **See Field 11F**

20C. ELECTRICITY AND MAGNETISM

AD-473 662 **Field 20C, 20I**
CFSTI Prices: HC$2.00 MF$0.50
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
MEASUREMENT OF ELECTRICAL CONDUCTIVITY IN A LOW-DENSITY SUPERSONIC PLASMA,
by J. A. Sprouse. Nov 65, 35p AEDC-TR-65-146
Contract AF 40 (600)-1200
Projs. AF-8951, ARO-RW3501
Task 895101
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Argon, Plasma jets), (*Plasma jets, Electrical conductance), (*Electrical conductance, Measurement), Supersonic flow, Coils, Crystal oscillators, Transducers, Coupling circuits, Probes (Electromagnetic), Calibration, Electric arcs, Plasma oscillations, Electrons, Density, Magnetic fields.

Identifiers: Hydromagnetic effects.

Electrical conductivities in the range from 70 to 280 MHOS/meter were measured in an arc-heated, low-density, supersonic argon plasma. Measurements were made using a single layer coil acting as one branch of a tuned parallel circuit of a crystalcontrolled oscillator operating at 5 MC/sec. Electromagnetic coupling between radio-frequency-excited coils and plasmas was examined, and the results are presented in terms of a nondimensional parameter, QS, which, for a particular coil, is a function only of the conductivity of the plasma surrounding the coil. Calculated conductivities using a combined form of the spitzer-harm and Chapman-Cowling equations for prescribed plasma conditions compare favorably with the measured results. (Author)

AD-639 738 **Field 20C, 20B**
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
INTERFACIAL POLARIZATION EFFECTS ASSOCIATED WITH SURFACES AND INTERFACES,
by N. M. Tallan, H. C. Graham, and J. M. Wimmer. 1966, 22p ARL-66-0171
Proj. AF-7021
Availability: Published in Materials Science Research v3 p111-30 1966.

Descriptors: (*Materials, Dielectric properties), (*Crystals, Polarization), Surface properties, Sodium compounds, Chlorides, Single crystals, Sapphires, Sorption, Defects (Materials), Test methods.

The dispersion of the capacitance and conductance of a specimen with frequency, arising from the presence of interfaces between regions of differing dielectric properties, can be used to study the geometry and electrical properties of the more conducting regions. The measurement and interpretation of these interfacial polarization effects are discussed, with particular emphasis on their application to studies of surface effects in single crystals. The results of experimental studies of the variation in electrical properties of relatively thick (approximately 10 microns) surface layers in sapphire produced by the adsorption and desorption of gases, incomplete equilibration of composition in various oxygen partial pressures, and the presence of impurities and preliminary results of interfacial polarization studies in sodium chloride crystals are presented. (Author)

AD-639 744 **Field 20C, 9E**
CFSTI Prices: HC$5.00 MF$1.00
Syracuse Univ., N. y. dept. of Electrical Engineering.
MATRIX METHODS FOR SOLVING FIELD PROBLEMS. VOLUME I. MATRIX TECHNIQUES AND APPLICATIONS.
Final rept., Mar 65-Mar 66,
by Roger F. Harrington, Long-Fei Chang, Arlon T. Adams, Robert Wallenberg, and Thomas Bristol. Aug 66, 183p
Contract AF 30(602)-3724
Proj. AF-4519
Task 451901
RADC-TR-66-351-Vol-1

Descriptors: (*Field theory, *Matrix algebra), (*Antennas, Field theory), Programming (Computers), Boundary value problems.

The report presents general procedures for solving field problems of engineering interest using digital computer techniques. The basic concept is to represent a boundary-value problem by a superposition integral, approximate the integral equation by a matrix equation, and invert the matrix for a solution. The theory is described in terms of the method of moments, which is equivalent to the variational method. For electromagnetic antenna and scattering problems, the method gives a matrix whose elements can be interpreted as generalized impedances. These impedances are closely related to those used in the theory of loaded antennas and scatterers, and hence such loaded structures can also be treated. A solution for wire antennas and scatterers of arbitrary shape is formulated in detail, and calculations for linear wire antennas and scatterers, both loaded and unloaded, have been made. Additional problems treated by these procedures are two-dimensional scattering by conducting cylinders and by dielectric cylinders, and three-dimensional scattering by bodies of revolution. These problems are used to show the effect of various approximations in the solution, in an attempt to draw some general conclusions as to the best approximations. Special procedures for inverting matrices have also been considered, to take into account any symmetry properties present in the matrices. A considerable saving in computation time can often be made by properly utilizing these symmetries. (Author)

AD-639 745 **Field 20C, 9E**
CFSTI Prices: HC$5.00 MF$1.00
Syracuse Univ., N. Y. Dept. of Electrical Engineering.
MATRIX METHODS FOR SOLVING FIELD PROBLEMS. VOLUME II. COMPUTATIONS FOR LINEAR WIRE ANTENNAS AND SCATTERERS.
Final rept., Mar 65-Mar 66,
by Roger F. Harrington, and Joseph Mautz. Aug 66, 166p
Contract AF 30(602)-3724
Proj. AF-4519
Task 451901
RADC-TR-66-351-Vol-2
See also AD-639 744.

Descriptors: (*Field theory, *Matrix algebra), (*Antennas, Field theory), Programming (Computers), Numerical analysis.

The report gives general computer programs and tables of computations for linear wire antennas and scatterers with arbitrary excitations and loads. The parameters calculated include the input impedance of wire antennas with sources at arbitrary points along the wire, input impedance of loaded wire antennas, mutual admittance between collinear antennas, monostatic and bistatic scattering from linear wires both loaded and unloaded, and general admittance parameters for loaded wire scatterers. The computations are for wires of length-to-diameter ratios ranging from 10 to 2000, and for length-to-wavelength ratios from 0.05 to 2.10 in increments of 0.05. (Author)

AD-639 852 **Field 20C, 20E**
Not available from CFSTI.
Oxford Univ. (England). Dept. of Engineering Science.
TIME RESOLUTION OF LASER INDUCED ELECTRON AND ION EMISSION,
by S. H. Khan, F. A. Richards, and D. Walsh. 27 Sep 65, 4p
Grant AF-EOAR-37-65
Proj. AF-9767
Task 976702
AFOSR-66-1573
Availability: Published in IEEE Journal of Quantum Electronics vQE1 n8 p359-60 Nov 1965.

Descriptors: (*Lasers, Secondary emission), (*Tantalum, Secondary emission), (*Niobium alloys, Secondary emission), Ruby, Ions, Electrons, Time, Resolution.

A Q-switched ruby laser illuminated tantalum and niobium-tin targets with 75 nanosecond, 50 millijoule pulses. Electron and ion time histories over the 50 to 500 nanosecond range are reported. (Author)

AD-639 908 **Field 20C, 9E**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
NUMERICAL METHOD OF DETERMINING TRANSIENT PROCESSES IN NONLINEAR ELECTRIC NETWORKS ON DIGITAL COMPUTERS.
Translation series,
by A. V. Vulfson. 19 Aug 66, 13p TG-230-T487
Contract NOw-62-0604
TT-66-62383
Trans. of Akademiya Nauk SSSR. Izvestiya. Energetika i Transport, n1 p64-70 1966.

Descriptors: (*Transients, Numerical methods and procedures), (*Electrical networks, Transients), Nonlinear systems, Linear systems, Functions, Electrical impedance, USSR.

A method is proposed for determining transient processes in electric networks with one nonlinearity and an arbitrary linear part. The initial data for solution are the transfer functions and the impedances of the linear part of the network. The results of a check on the URAL-2 computer are given. (Author)

AD-640 225 **Field 20C, 20N**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
NEWS OF INSTITUTIONS OF HIGHER LEARNING. PHYSICS: SELECTED ARTICLES.
18 Apr 66, 19p FTD-TT-65-762
TT-66-62411
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Fizika (USSR) n3 p3-6, p72-7 1964.

Descriptors: (*Physics, Scientific research), (*Particle trajectories, *Crossed field devices), (*Dielectrics, Propagation), Electromagnetism, Slot antennas, Waveguide slots, Resonance, Polarization, USSR.

Contents: Modeling of Particle Movement in Overlapping Electrical and Magnetic Fields, by N. V. Trikhanova and P. M. Shchanin; Effect of a Dielectric on the Length Resonance Longitudinal Slots and Turn of Polarization of a parallel H Wave in a Round Wave Guide, by L. B. Shtrapenin.

AD-640 299 **Field 20C, 7E, 20F**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
CERTAIN PHOTOCONDUCTIVITY LAWS IN LIQUID ORGANIC SEMICONDUCTORS,
by Yu. A. Kopylov, and T. N. Trofimova. 18 Apr 66, 15p FTD-TT-65-933
TT-66-62439
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Fizika (USSR), n5 p28-33 1964.

Descriptors: (*Semiconductors, Liquids), (*Halogenated hydrocarbons, *Photoconductivity), Organic compounds, Solutions, Methane, Benzenes, Ethyl ethers, Absorption spectrum, Carriers (Semiconductors), USSR.

Identifiers: Chlorobenzenes, Iodobenzenes, Methylene iodides, Phenyl bromides.

An investigation was made of the photoconductivity of halide substitutes of methane and benzene and binary systems of these substances with diethyl ether. It was established that positive photoconductivity of the investigated binary systems at definite concentration values of haogeno substitutes are changed by negative photoconductivity. For monocomponent samples photoactivity appears to be radiation close to long wave absorption boundary, while for the binary systems, revealing

a negative photoconductivity, photoactivity appears to be radiation lying far beyond the limits of long wave boundary of proper absorption. In the field of absorption band of the system, the nature of negative photoconductivity changes, and for bromobenzene the negative photoconductivity is changed by a positive. (Author)

AD-640 527 **Field 20C, 20L**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
ANTIFERROMAGNETIC RESONANCE IN RbMnF3 BELOW THE SPIN-FLOP TRANSITION.
Thesis,
by William J. Ince. Nov 65, 3p MS-1469
Contract AF 19 (628)-5167
ESD-TR-66-218
Availability: Published in Journal of Applied Physics v37 n3 p1132-3 Mar 1 1966.

Descriptors: (*Antiferromagnetism, *Manganese compounds), Magnetic resonance, Transition temperature, Rubidium compounds, Fluorides, Anisotropy, Crystal lattices.

Identifiers: Manganese rubidium fluoride.

Antiferromagnetic resonance in RbMnF3, with the magnetization in the flopped state, has been reported previously. This paper reports an investigation of resonance for the low-field region 0-5000 Oe. For applied fields less than about 3000 Oe, the static equilibrium position of the sublattice magnetizations is in general multivalued, due to the cubic anisotropy. Experimental results are presented which show the resonance, at 4.2K, as a function of magnitude and direction of the applied field with respect to the cubic lattice. A theory of antiferromagnetic resonance for cubic materials is also presented. With appropriate choice of coordinates, the linearized equations of motion permit the normal mode frequencies to be derived. By considering the magnetization to be locally uniform, and confining the applied field to a symmetry plane, solution of the static equilibrium problem was obtained. The model is used in conjunction with the resonance analysis to calculate the resonant frequencies. There is good agreement between theory and experiment for some of the observed resonances. (Author)

AD-640 533 **Field 20C**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
SENSITIVE PULSED MAGNETORESISTIVE MEASUREMENT OF MAGNETIC FILM H SUB K,
by Ralph C. Johnston. Nov 65, 3p MS-1470
Contract AF 19 (628)-5167
ESD-TR-66-219
Availability: Published in Journal of Applied Physics v37 n3 p1466-7 Mar 1 1966.

Descriptors: (*Films, Magnetic alloys), Magnetic properties, Anisotropy, Annealing, Iron alloys, Nickel alloys, Measurement.

Identifiers: Permalloy.

For a magnetic annealing experiment with Permalloy films it was necessary to measure the uniaxial anisotropy field H sub k without breaking vacuum after deposition, while maintaining an annealing field in specified directions. Two systems are described: model 1 using a biased, triangular, transverse annealing field with the minimum peak maintained at H sub k by use of negative feedback to the bias; model 2 using relays to switch from the annealing field (parallel, transvers, or rotating) to a dc transverse sensing field maintained at H sub k.

AD-640 534 **Field 20C**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
SOME REMARKS ON SPECTRUMS OF MODULATED PULSE TRAINS,
by Oscar A. Z. Leneman. 18 Nov 65, 2p JA-2717
Contract AF 19 (628)-5167
ESD-TR-66-382
Availability: Published in Proceedings of the IEEE v54 n5 p793 May 1966.

Descriptors: (*Pulse amplitude modulation, Fourier analysis), Integral transforms, Statistical analysis.

This note gives the spectrums of two periodic pulse trains having two different modulation schemes. (Author)

N66-29221 **Field 20C**
CFSTI Prices HC$4.00 MF$0.75
Ohio State Univ., Columbus.
A STUDY OF ELECTRODYNAMICS INVOLVING MOVING MEDIA.
by L.-J. Du. Jul 66, 117p NASA-CR-508
Grant NSG-448

Descriptors: *Electrodynamics, *Half-space, *Maxwell equation, *Wave equation, *Waveguide, Electric, Equation, Half, Line, Magnetic, Medium, Moving, Propagation, Semiinfinite, Source, Space, Wave.

For abstract, see S 04 16.

N66-29222 **Field 20C**
CFSTI Prices HC$4.00 MF$1.00
Measurement Analysis Corp., Los Angeles, Calif.
ELECTRICAL ANALOGIES AND THE VIBRATION OF LINEAR MECHANICAL SYSTEMS.
Jun 66, 124p NASA-CR-510
Contract NAS8-20020

Descriptors: *Electric analogy, *Linear system, *Mechanical system, *Structural vibration, Amplifier, Analog, Analogy, Beam, Circuit, Current, Electric, Frequency, Generator, Impedance, Linear, Mechanical, Mobility, Response, Structural, System, Transformer, Vibration.

For abstract, see S 04 16.

N66-29352 **Field 20C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
DESIGN, CONSTRUCTION, AND PERFORMANCE OF CRYOGENICALLY COOLED AND SUPERCONDUCTING ELECTROMAGNETS.
by W. D. Coles, and J. C. Lawrence. 1965, 16p
NASA-TM-X-52121
Presented At The Intern. Symp. On Magnet Technol., Sponsored By Stanford Univ., Calif., 8-10 Sep. 1965

Descriptors: *Construction, *Cryogenic magnet, *Electromagnet, *Superconducting magnet, Aluminum, Coil, Cryogenic, Design, Field, High, Intensity, Liquid, Magnet, Neon, Niobium, Performance, Superconductivity, Tin, Zirconium.

For abstract, see S 04 16.

AD-639 650 **See Field 20L**

AD-639 803 **See Field 9C**

AD-639 888 **See Field 20D**

AD-639 904 **See Field 20L**

AD-640 149 **See Field 20E**

AD-640 152 **See Field 20J**

AD-640 153 **See Field 20J**

AD-640 184 **See Field 10B**

AD-640 309 **See Field 20L**

PB-170 936 **See Field 20L**

20D. FLUID MECHANICS

AD-468 984 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
AVCO Everett Research Lab., Everett, Mass.
TRANSITION AND STROUHAL NUMBERS FOR THE INCOMPRESSIBLE WAKE OF VARIOUS BODIES.
Research rept.,
by A. Goldburg, and B. H. Florsheim. Aug 65, 22p RR-229
Contract DA-19-020-AMC-0210
Prepared in cooperation with Bell Telephone Labs., Inc., Whippany, N. J. under contract DA-30-069-ORD-1955.

Descriptors: (*Bodies of revolution, Wake), (*Wake, Turbulence), Incompressible flow, Configuration, Conical bodies, Spheres, Boundary layer transition, Stability, Reynolds number, Momentum, Thickness, Vortices, Experimental data, Correlation techniques, Hydrodynamics, Blunt bodies.

Incompressible wakes behind three-dimensional bluff bodies have been studied in order to gain information about the effects of body geometry. The results of magarvey and bishop achieved by dropping liquid droplets through another liquid were duplicated using solid spheres and observations were made of the wakes of bodies of various shapes, particularly cones. It was found that wake transition, defined as the first occurrence of finite unsteadiness, could be approximately correlated for a range of spheres and cones by a Reynolds number based on the total wake momentum thickness. The cases of the teardrop and the disc deviate from this correlation and explanations are discussed. (Author)

AD-478 914 **Field 20D, 1C, 16D**
CFSTI Prices: HC$1.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
EXPLORATORY FLOW MEASUREMENTS IN THE WING-BODY JUNCTION OF A POSSIBLE MACH FOUR VEHICLE.
Technical rept.,
by P. L. Roe. Nov 65, 22p TR-65257

Descriptors: (*Wing-body configurations, Supersonic characteristics), Flow fields, Pressure, Airspeed, Jet engine inlets, Vortices, Delta wings, Supersonic flow, Deflection, Wind tunnel models, Model tests, Performance (Engineering), Experimental data, Angle of attack, Yaw, Great Britain.

Measurements of flow direction, total pressure, and Mach number were made near a possible engine inlet location in the wing-body junction of a projected high-speed vehicle layout. An undesirable feature of the flow in the presence of a vortex in the corner of the junction. (Author)

AD-639 724 **Field 20D**
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
MOMMENT ON 'REVIEW OF THEORETICAL INVESTIGATIONS ON EFFECT OF HEAT TRANSFER ON LAMINAR SEPARATION,
by K. O. W. Ball. 17 Sep 65, 3p ARL-66-0092
See also AD-609 575.
Availability: Published in AIAA Journal 1966.

Descriptors: (*Heat transfer, Laminar flow), (*Laminar flow, Separation), Laminar boundary layer, Pressure, Theory.

AD-639 727 **Field 20D**
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.

EXPERIMENTAL STUDY OF THE FLOW STRUCTURE AND HEAT TRANSFER FOR A REARWARD FACING STEP IN SUPERSONIC FLOW,
by M. G. Scherberg, and Howard E. Smith. 15 Dec 65, 10p ARL-66-0164
Proj. AF-7063
Prepared in cooperation with Dayton Univ., Ohio.
Availability: Published in Israel Journal of Technology v4 n1 p55-62 1966.

Descriptors: (*Aerodynamic configurations, Supersonic characteristics), Shock waves, Heat transfer, Flow fields, Supersonic flow.

An experimental study of a rearward facing step in supersonic flow disclosed the presence of a relatively strong lip-shock at the higher free stream pressures of the test as well as some upstream effects which need attention. Among other things, the Prandtl-Meyer expansion fan usually used in simplified analytical models of the flow is clearly not applicable and it appears that a more complex model must be developed. For this purpose the experimental data are being studied in three parts; an upstream step-neighborhood part; a reattachment section; and a downstream reattached flow part. The paper presents results on the downstream part, and also some heat transfer results in the reattachment section. A principal point of interest noted at this time is the appearance of a critical Reynolds number based on the step-height. This critical number appears in the flow structure in the upstream and downstream section, and in the heat transfer data of the reattachment section. A representative case is presented showing some of the flow through the lip-shock, the reattachment shock, and also the slip line flow emerging from the intersection of these shocks. (Author)

AD-639 773 **Field 20D, 13M**
Not available from CFSTI.
Graduate Aeronautical Labs., Calif. Inst. of Tech., Pasadena.
SUPERSONIC FLUTTER OF CIRCULAR CYLINDRICAL SHELLS SUBJECTED TO INTERNAL PRESSURE AND AXIAL COMPRESSION.
Revised ed.,
by Mervyn D. Olson, and Y. C. Fung. 14 Dec 65, 7p GALCIT-Pub-620
Presented at AIAA Annual Meeting (2nd), San Francisco, Calif., July 26-29, 1965.
Availability: Published in AIAA Journal v4 n5 p858-64 May 1966.

Descriptors: (*Structural shells, Flutter), (*Cylindrical bodies, Supersonic flow), Loading (Mechanics), Buckling (Mechanics).

Results of recent experiments on the flutter of circular cylindrical shells in the Mach number range 2.5-3.5 are presented. Three shells with radius-to-thickness ratios of 2000 were subjected to radial external pressure loadings and to combinations of axial compressive loading and internal pressurization while in the presence of an external, axially-directed supersonic flow. Small amounts of internal pressurization were very stabilizing with respect to flutter, but moderate amounts reduced stability to the unpressurized level. However, high internal pressures completely stabilized the shells. The axial compressive loading was slightly destabilizing for moderate amounts of internal pressurization. The flutter modes (which were standing waves in the axial direction with zero, one, or two circumferential nodal lines) contained many waves around the circumference (of the order of 20) that traveled in the circumferential direction. This circumferentially traveling wave phenomenon possibly results from the nonlinear nature of cylindrical shells. Model integrity was not threatened by even the most violent flutter, which occurred just prior to buckling under radial external pressure loading and just after buckling under axial compressive loading. Buckled portions of a shell did not flutter. It appears that the large local curvatures encountered in the buckling of a cylindrical shell tend to stabilize the shell locally. However, it also appears that the localized buckling usually encountered in practice reduces the stability of any unbuckled regions of the shell. (Author)

AD-639 804 **Field 20D**
CFSTI Prices: HC$5.00 MF$1.00
Pennsylvania State Univ., University Park. Dept. of Aerospace Engineering.
AN EXPERIMENTAL INVESTIGATION OF THE VISCOUS SUBLAYER IN TURBULENT PIPE FLOW,
by Henry Palmer Bakewell Jr. Sep 66, 183p
Grant Nonr (G)-00043-65

Descriptors: (*Turbulent boundary layer, Pipes), Viscosity, Thickness, Velocity, Statistical functions.

The boundary layer research facility utilizing glycerine with its high viscosity was constructed to permit detailed experimental investigation of the viscous sublayer. In this facility at a pipe Reynolds number of 8700 the sublayer thickness was 0.110 in. which is sufficiently thick to allow detailed investigation in a region that occupies the innermost few thousandths of an inch in most typical air and water flows. Detailed measurements of the streamwise fluctuating velocities with hot-film anemometers were obtained within the viscous sublayer as well as in the transition region between the linear and logarithmic mean velocity profiles. These data were used to form the space-time correlation function of the streamwise fluctuating velocities. From these data an eigen-function expansion of the streamwise fluctuating velocity was obtained which was used to infer the dominant large scale structure of the flow in the wall region. (Author)

AD-639 805 **Field 20D, 11H**
CFSTI Prices: HC$1.00 MF$0.50
North Star Research and Development Inst., Minneapolis, Minn.
DEVELOPMENT OF A FLUID CONCENTRATED DISPERSION OF A WATER-SOLUBLE POLYMER CAPABLE OF REDUCING THE FRICTION OF WATER UNDER TURBULENT CONDITIONS.
Final rept. Jun 65-Aug 66,
by Ralph E. Forester, and Peter S. Francis. 29 Jul 66, 24p
Contract Nonr-4827 (00)
Proj. S-R009-01-01

Descriptors: (*Polymers, Lubricants), (*Water, Friction), Turbulence, Drag, Ship hulls.

A method of using water soluble polymers to reduce the friction caused by turbulent flow of water was investigated by employing fluid, concentrated dispersions (slurries) of polymer in nonsolvent carriers. Prototype 10-percent slurries of various drag reducing polymers were injected into flowing turbulent water streams, and friction reductions as great as 49 percent were noted with mixing times as short as 1.5 seconds. Higher friction reduction was achieved at somewhat longer times. The system appears to be a very promising approach to applying drag reducing polymers to the waters around a ship hull. (Author)

AD-639 888 **Field 20D, 20C**
Not available from CFSTI.
National Magnet Lab., Mass. Inst. of Tech., Cambridge.
MAGNETIC BUBBLE TRAPPING IN LIQUIDS,
by M. H. Crozier. 11 Aug 65, 5p
Contract AF 49 (638)-1468
Proj. AF-9764
AFOSR-66-1322
Availability: Published in Journal of Applied Physics v36 n12 p3802-3804 Dec 1965.

Descriptors: (*Paramagnetic materials, Liquids), (*Magnetic fields, Bubbles), Hydrostatic pressure, Liquefied gases, Water, Helium.

In a high magnetic field a liquid is subject to forces due to its para- or diamagnetism which contribute to the hydrostatic pressure at each point. It is shown that this contribution may give rise to a local pressure minimum at which bubbles in the liquid will accumulate. This effect is often produced in commercial liquid nitrogen with a standard laboratory electromagnet, because of the paramagnetism caused by a small oxygen content, and can cause experimental problems. The corresponding effect caused by diamagnetism has now been observed in water with a high-field solenoid operated in the range 165-205 kG, and it is predicted that a bubble trap will likewise occur in liquid helium when a magnet of this design is operated at slightly higher fields. Such an effect can produce irregularities in the results of low-temperature experiments in high magnetic fields unless bubbles are prevented from forming. (Author)

AD-639 902 **Field 20D**
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
EIN EXTREMALPRINZIP FUR REIBUNGSFREIE STATIONARE STROMUNGEN EINES KOMPRESSIBLEN MEDIUMD,
by Gottfried Guderley. 30 Aug 65, 12p ARL-66-0173
Proj. AF-7071
Text in German.
Availability: Published in Math Annalen v165 p62-80 1966.

Descriptors: (*Compressible flow, Mathematical analysis), Fluid dynamic properties.

AD-639 981 **Field 20D**
CFSTI Prices: HC$5.00 MF$1.00
Sikorsky Aircraft Div., United Aircraft Corp., Stratford, Conn.
A PRESENTATION OF MEASURED AND CALCULATED FULL-SCALE ROTOR BLADE AERODYNAMIC AND STRUCTURAL LOADS.
Final rept.,
by J. P. RabbottJr, V. M. Paglino, and A. A. Lizak. Jul 66, 182p SER-58398
Contract DA-44-177-AMC-53 (T)
Proj. DA-1P125901A14604
USAAVLABS-TR-66-31

Descriptors: (*Rotor blades (Rotary wings), Loading (Mechanics)), Stresses, Aerodynamic loading, Wind tunnels, Tests, Aeroelasticity, Helicopters.

Identifiers: H-34 aircraft.

A test of a set of Sikorsky CH-34 rotor blades was conducted in the NASA/Ames full-scale wind tunnel at speeds of 110 to 175 knots. One blade of the set was instrumented to measure differential chordwise pressures, as well as flapwise, chordwise and torsional stress. The test results are presented, two- and three-dimensional pressure distributions are compared, and a correlation of airloads and blade stresses is made with a flexible blade aeroelastic theory, including both uniform and variable inflow assumptions. Correlation of airloads and stresses with theoretical results was generally good. Inclusion of variable inflow improved correlation on both advancing and retreating sides of the disk at speeds as high as 175 knots, but the need for a more precise wake treatment is indicated. There is also evidence of a requirement for including lifting surface effects in the calculation at the advancing blade tip. A comparison of some of the wind tunnel data with flight test results shows good agreement. (Author)

AD-640 010 **Field 20D, 20M**
CFSTI Prices: HC$1.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
PRESSURE VARIATIONS INSIDE A GAS-FILLED ENCLOSURE DUE TO CAPILLARY FLOW,
by Henry Gerber. 3 May 66, 20p NOLTR-66-115
Proj. CM12-M1-000/F108-08-10

Descriptors: (*Gases, *Pressure), (*Capillary tubes, Gases), Thermodynamics, Velocity.

The report presents methods for computing the effect of capillary flow on the pressure and temperature of confined gases. Formulas for computing the gas velocity in the capillary tube are also given. (Author)

AD-640 148 **Field 20D, 7D**
CFSTI Prices: HC$7.00 MF$1.50
Pennsylvania State Univ., University Park. Dept. of Aeronautical Engineering.
AN EXPERIMENTAL STUDY OF GRID TURBULENCE IN DILUTE HIGH-POLYMER SOLUTIONS,
by Andrew G. Fabula. Jun 66, 315p
Grant Nonr (G)-00043-65

Descriptors: (*Polymers, *Turbulence), Experimental data, Solutions, Pipes, Fluid mechanics.

The aim of this study was to determine the effects upon the longitudinal, one-dimensional energy spectrum in grid turbulence of the non-Newtonian properties produced by low concentrations of high molecular weight polymers dissolved in water. By studying an approximately isotropic turbulence, in which the experimental effects of the non-Newtonian properties of the solution might be most easily correlated with theory, it was intended to contribute to the eventual understanding of the mechanism of the friction reduction which the test solutions typically show in turbulent shear flows in pipes and boundary layers. A 48-foot towing tank, with cross-section of 48 by 45 inches, was constructed and equipped for grid-turbulence measurements in water and aqueous solutions and suspensions. The experimental procedure was to tow a vertical grid along the tank, followed by a turbulence sensor moving at the same speed as the grid. The grid was towed at a standard speed of 36.2 cm/s. The grid form was chosen to allow a correlation of the results in water with grid turbulence measurements in air. The mesh width was 11.8 cm. The grid Reynolds number, RM, was roughly 40,000 and the turbulence Reynolds number, RL, was about 500.

AD-640 189 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.
AN EXPERIMENTAL INVESTIGATION OF AIR FLOW OVER A WAVY PLATE,
by A. K. Gupta, and E. L. Mollo-Christensen. Aug 66, 16p
Contract Nonr-1841 (89)

Descriptors: (*Gas flow, Curved profiles), Rectangular bodies, Boundary layer, Angle of attack, Pressure, Subsonic flow, Experimental data.

Experiments were carried out with the object of obtaining additional data on the shape of the pressure distribution over a wavelength, the sheltering coefficients, and their relation to Brooke Benjamin's theory.

AD-640 227 **Field 20D, 20M**
Not available from CFSTI.
Boston Univ., Mass. Dept. of Physics.
SMALL-PARAMETER EXPANSIONS OF LINEAR BOLTZMANN COLLISION OPERATORS,
by H. Akama, and A. Siegel. 10 Dec 64, 29p
Grant AF-AFOSR-62-177
Proj. AF-9767
Task 976701
AFOSR-66-1587
Availability: Published in Physica v31 p1493-1519 1965.

Descriptors: (*Irreversible processes, Operators (Mathematics)), (*Statistical mechanics, Operators (Mathematics)), (*Brownian motion, Statistical mechanics), Transport properties, Stochastic processes, Probability, Molecules, Polynomials.

An important problem in the study of irreversible processes is the approximation of the linear Boltzmann operator by the Fokker-Planck operator or, when this is insufficient, by still further terms. The first attempt at a solution of this problem was the Kramers-Moyal expansion. Van Kampen and Siegel have reformulated this expansion with the aim of systematizing terms according to order of magnitude. Very few studies have been made of this problem in the multidimensional case, particularly collision processes. The present paper derives a new and greatly simplified formula for the coefficients of the Kramers-Moyal series in collision processes. This is applied to Siegel's order-of-magnitude rearrangement ('CD expansion'), which is found to have the required property at least in the case of power-law molecular interactions. Finally, we present a new stochastic model, related to the theory of collision processes, for the sake of its mathematical interest and simplicity. (Author)

AD-640 228 **Field 20D, 12A, 7D**
Not available from CFSTI.
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
KERNEL OF THE LINEARIZED WANG CHANG-UHLENBECK COLLISION OPERATOR,
by Leib Finkelstein, and S. Harris. 30 Jul 65, 6p
Grant AF-AFOSR-62-266
Proj. AF-9749
Task 974901
AFOSR-66-1203
Availability: Published in Physics of Fluids v9 n1 p8-11 Jan 1966.

Descriptors: (*Kinetic theory, *Operators (Mathematics)), (*Statistical mechanics, Operators (Mathematics)), Partial differential equations, Integrals, Vector analysis, Groups (Mathematics).

Identifiers: Wang Chang-Uhlenbeck equation.

An explicit form of the kernel of the linearized Wang Chang-Uhlenbeck collision operator is derived. This kernel is shown to be nonsymmetric in the arguments in which the kernel of the linearized Boltzmann collision operator is symmetric. Knowledge of the kernel reduces the dimension of the integral over the distribution function from 5 to 3. (Author)

AD-640 241 **Field 20D, 20A**
Not available from CFSTI.
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
STEADY-STATE OSCILLATIONS IN A GAS,
by Harold Weitzner. 1965, 22p
Grant AF-AFOSR-62-266
Proj. AF-9749
Task 974901
AFOSR-66-1200
Report on Kinetic Theory.
Availability: Published in Rarefied Gas Dynamics v1 s1 p1-20 1965.

Descriptors: (*Sound, Propagation), (*Gases, Kinetic theory), Oscillation, Transport properties, Partial differential equations, Boundary value problems.

Identifiers: Krook equation.

The linearized one-dimensional Krook equation in solved for the case of a half-space of gas bounded by an oscillating wall. This situation corresponds to the commonly studied problem of the propagation of sound in a gas. The question of when a sound wave is observable is considered. Unless two conditions hold the sound wave will be lost in a larger, irregular disturbance. First, the observation must be taken many mean free paths from the wall. Second, the wave train is observable only for a limited length, and the number of wavelengths seen is of the order of the collision frequency over the oscillations frequency. (Author)

AD-640 242 **Field 20D**
Not available from CFSTI.
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
THE TRANSITIONAL DRAG ON A CYLINDER AT HYPERSONIC MACH NUMBERS,
by Marian H. Rose. 1963, 18p
Grant AF-AFOSR-62-266
Proj. AF-9749
Task 974901
AFOSR-66-1201
Rarefied Gas Dynamics v1 p312-25 1965.

Descriptors: (*Superaerodynamics, Cylindrical bodies), Drag, Hypersonic characteristics.

The drag on a cylinder traversing a neutral, rarefied gas is computed in the hypersonic range. Although intermolecular collisions are assumed rare they are not entirely negligible and, therefore, will give rise to a small departure from free-flow conditions. The mathematical procedure is similar to that previously applied to the case of a sphere. Using the identical boundary conditions for both geometries, it is then possible to gain some insig[illegible] into the effect of shape upon drag. Comparisons are also made with the theoretical results obtained for an infinite, two-dimensional strip. Finally, an attempt is made to relate our theoretical predictions for the cylinder with the presently available experimental results. (Author)

AD-640 244 **Field 20D, 12A, 7D**
Not available from CFSTI.
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
RICE-ALLNATT ASSUMPTION IN THE LOW-DENSITY LIMIT,
by S. Harris. 4 Aug 65, 5p
Grant AF-AFOSR-62-266
Proj. AF-9749
Task 974901
AFOSR-66-1202
Availability: Published in Journal of Chemical Physics v44 n2 p613-5 Jan 15, 1966.

Descriptors: (*Kinetic theory, *Distribution functions), (*Statistical mechanics, Kinetic theory), Potential scattering, Partial differential equations, Gases, Particles.

Identifiers: Particle interactions, Rice-Allnatt theory.

The Boltzmann collision term for a system of particles which interact through a potential composed of a hard repulsive potential plus a soft attractive potential is expanded in the small parameter which characterizes the soft potential. If the hard and soft forces do not overlap, it is shown, in agreement with the Rice-Allnatt assumption, that in lowest significant order no cross terms containing the hard and soft potentials appear in the collision term. (Author)

AD-640 251 **Field 20D, 20M**
CFSTI Prices: HC$1.00 MF$0.50
Polytechnic Inst. of Brooklyn, N. Y. Dept. of Aerospace Engineering and Applied Mechanics.
FLOW OF RADIATING GAS PAST A CORNER,
by Prem K. Khosla. Jun 66, 18p PIBAL-981
Contract Nonr-839 (34)
Proj. NR-061-135

Descriptors: (*Gas flow, Thermal radiation), Equations of motion, Partial differential equations, Heat transfer, Approximation (Mathematics), Temperature, Supersonic flow, Two-dimensional flow, Thermodynamics.

An iterative method to solve the nonlinear problem for the flow of a radiating gas past a corner is given and its relation to the results already obtained from linearized solution is indicated. The

method centers around what is called the local temperature approximation. (Author)

AD-640 278 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
North American Aviation, Inc., Los Angeles, Calif.
HYPERSONIC FLOW OVER LIFTING WING-BODY COMBINATIONS,
by N. D. Malmuth. 1 Jun 66, 17p NA-66-431
Contract AF 49 (638)-1477
AFOSR-66-1398

Descriptors: (*Wing-body configurations, *Hypersonic flow), Aerodynamics, Boundary value problems, Lift, Delta wings, Pressure, Conical bodies, Functions, Shock waves.

Using linear rotational flow methods within the framework of Hypersonic Small Disturbance Theory, the flow over a class of lifting wing-body combinations is analyzed. These configurations consist of a delta wing mounted on top of a slender ruled body of arbitrary cross section, contained within the parabolic Mach cone. Solutions for the shock shape, lift and the pressure field between the body and shock are obtained using eigenfunction techniques developed in connection with other wedge-like flows. Recommendations are made for future extensions of the analysis involving the determination of optimum contouring as well as treatment of more general classes of bodies. (Author)

AD-640 289 **Field 20D, 20M**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ENTROPY EFFECTS IN THREE-DIMENSIONAL HYPERSONIC FLOWS OF GAS OVER SLIGHTLY BLUNT-NOSED BODIES,
by V. V. Sychev. 13 Apr 66, 9p FTD-TT-65-1827
TT-66-62431
Unedited rough draft trans. of Archiwum Mechaniki Stosowanej (Poland) v16 n2 p517-9 1964.

Descriptors: (*Hypersonic flow, *Entropy), (*Blunt bodies, Hypersonic flow), Three-dimensional flow, Poland, Bodies of revolution, Angle of attack.

The purpose of the study is to give brief consideration to the asymptotic effect of slight blunting in the case of flow over nonaxisymmetrical bodies, or bodies of revolution moving at angles of attack. (Author)

AD-640 325 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ON THE ENTRAINED MASS OF A SUPERSONIC JET IN OFF-DESIGN SYSTEM,
by B. A. Balanin. 25 Apr 66, 12p FTD-TT-65-1719
TT-66-62449
Unedited rough draft trans. of Inzhenerno-Fizicheskii Zhurnal (USSR) v8 n5 p574-8 1965.

Descriptors: (*Supersonic flow, Jets), Design, Nozzles, USSR.

The results are presented of experimental determination of the entrained mass of a supersonic jet in off-design systems of discharge. There is given an empirical formula which connects the entrained mass of the original area of the supersonic jet in off-design modes of out-flow with the number M sub a at the cut of the nozzle, with the off-design degree, and with the distance from the nozzle cut to the section under consideration. (Author)

AD-640 381 **Field 20D**
CFSTI Prices: HC$4.00 MF$0.75
Boeing Scientific Research Labs., Seattle, Wash. Mathematics Research Lab.
THE METHOD OF CHARACTERISTICS FOR THE SUPERSONIC FLOW OF AN IDEAL DISSOCIATING GAS. II. NONEQUILIBRIUM FLOW,
by F. Edward Ehlers. Jul 66, 113p D1-82-0548, Mathematical note-473
See also AD-607 353.

Descriptors: (*Supersonic flow, Mathematical analysis), (*Nonequilibrium flow, Supersonic flow), Dissociation, Programming (Computers), Wedges, Conical bodies, Shock waves, Entropy.

Identifiers: Method of characteristics.

A method of characteristics for computing the supersonic, nonequilibrium flow of a reacting and relaxing gas was formulated. The theory was specialized to the ideal dissociating gas of Lighthill and the procedures coded on the IBM 7094. Complete listings of the FORTRAN programs are provided together with instructions as to their use. As examples of the computation techniques, the flows over a wedge and cone were computed and described in detail. For both the wedge and the cone, there developed downstream from the vertex an entropy layer near the wall, a relaxation layer near the shock where the quantities change rapidly, and a near equilibrium layer in between. It was found that it is important to keep the size of the mesh small enough to adequately represent the relaxation layer if satisfactory convergence to the equilibrium state is to be obtained. (Author)

AD-640 393 **Field 20D**
CFSTI Prices: HC$4.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Dept. of Naval Architecture and Marine Engineering.
THE HYDRODYNAMIC FORCES AND PRESSURE DISTRIBUTIONS FOR AN OSCILLATING SPHERE IN A FLUID OF FINITE DEPTH,
by Shen Wang. Jun 66, 102p
Contract Nonr-3963 (01)

Descriptors: (*Spheres, Fluid dynamic properties), Oscillation, Underwater objects, Pressure, Boundary value problems, Potential theory.

The fluid motion due to a semi-submerged sphere making small vertical oscillations in the free surface of a fluid of finite uniform depth is discussed. The fluid is considered incompressible and nonviscous, and the problem is formulated as a boundary value problem in linear potential theory. The velocity potential is obtained by means of a superposition of a series of singularities, placed within the sphere, in such a manner that all boundary conditions are satisfied. The exact solution contains an infinite series whose coefficients are given by an infinite set of linear simultaneous equations. Since the series converge rapidly, practical computation with a truncated set is possible. In terms of the same expansion coefficients, expressions are also obtained for the hydrodynamic forces as well as the pressure distributions on both the sphere surface and bottom boundary. Numerical calculations of the added mass coefficient, damping parameter and pressure distributions were determined for various fluid depths over a significant frequency range. The results are presented and compared with results of the infinite depth case. The results of the analysis of the influence of the lower boundary at finite depth may be interpreted in terms of the change in surface wavelength, which is a function of the frequency of oscillation and the fluid depth. (Author)

AD-640 445 **Field 20D, 7D, 12A**
CFSTI Prices: HC$4.00 MF$0.75
Maryland Univ., College Park. Inst. for Fluid Dynamics and Applied Mathematics.
FUNCTIONS AND INTEGRALS CONNECTED WITH SOLUTIONS OF THE DIFFUSION OR HEAT FLOW EQUATION.
Technical note,
by J. M. Burgers. May 65, 103p BN-398
Contract AF 49 (638)-401, Grant AF-AFOSR-141-63
Proj. AF-9783
Task 978302
AFOSR-66-1946
Supported in part by grants AF-AFOSR-141-64 and AF-AFOSR-141-65.

Descriptors: (*Partial differential equations, *Boundary value problems), (*Diffusion, Equations), (*Heat transfer, Equations), Functions, Integrals.

The paper contains an investigation of the properties of certain functions connected with solutions of the ordinary diffusion or heat flow equation. In the first part of the paper the functions of interest are defined, and various properties of these functions are derived from a study of the partial differential equation and the behavior of its solutions when the boundary curve is subjected to variations. An integro-differential equation is obtained for one of the main functions, from which a series development is derived. - In the second part the boundary curve is always a parabola. A transformation of the field makes it possible to change this boundary into a straight line, the differential equation obtaining a slightly more complicated form. The new equation is solved by an application of Bessel functions of the order 1/3. New types of series development are obtained for the functions defined in the first part of the paper. - In the third part certain multiple integrals are evaluated, depending upon these functions defined. In an Appendix the relation of these investigations is indicated with previous work on statistical problems connected with the solution of a nonlinear diffusion equation. References are given to the main earlier publications, and a comparison is made of the notations used. (Author)

AD-640 517 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
TABLES OF SOME SUPERSONIC FLOW FUNCTIONS FOR PROPANE.
Technical rept.,
by I. D. Elliott. Jun 66, 33p TR-66164

Descriptors: (*Propanes, Supersonic flow), (*Supersonic nozzles, Propellants), Tables, Functions, Great Britain.

Tables are presented of some supersonic flow functions for propane (Gamma = 1.13) in the Mach number range 1 - 10. (Author)

AD-640 526 **Field 20D, 20M**
CFSTI Prices: HC$1.00 MF$0.50
Department of the Navy, Washington, D. C.
A CONVERGENT SHOCK WAVE IN A HEAT CONDUCTING GAS,
by E. I. Zababakhin, and V. A. Simonenko. 1966, 7p Trans-2084
TT-66-62468
Skhodyashchayasya Udarnaya Voln v Teploprovodnom Gaze, trans. of Prikladnaya Matematika i Mekhanika (USSR) v29 p334-6 1965.

Descriptors: (*Shock waves, Gases), Thermal conductivity, USSR.

LA-3466 **Field 20D, 9B**
CFSTI Prices: HC$5.00 MF$1.00
Los Alamos Scientific Lab., Univ. of California, N. Mex.
PARTICLE-IN-CELL METHOD FOR THE CALCULATION OF THE DYNAMICS OF COMPRESSIBLE FLUIDS,
by Anthony A. Amsden. Feb 66, 170p
Contract W-7405-eng-36

Descriptors: (*Compressible flow, *Dynamics).

For abstract, see N 20 19.

N66-27075 **Field 20D**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration.

dimensional flow, Axisymmetry, Blowing, Boundary, Compressible, Dimensional, Flow, Layer, Thickness, Two.

For abstract, see S 04 15.

N66-27076 Field 20D
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
WAVE-PLAN ANALYSIS OF UNSTEADY FLOW.
by R. G. Dorsch, C. Lightner, and D. J. Wood. 12 Jul 65, 42p NASA-TM-X-56728
Submitted For Publication

Descriptors: *Hydraulic system, *Unsteady flow, *Viscous fluid, Flow, Fluid, Hydraulic, Increase, Pressure, Pulse, System, Unsteady, Viscous, Wave.

For abstract, see S 04 15.

N66-27079 Field 20D
CFSTI Prices HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
EXPLORATORY MEASUREMENTS IN SPIRAL TURBULENCE.
by C. Van atta. 1965, 38p NASA-CR-64421
Contract NAS7-100
Submitted For Publication

Descriptors: *Concentric cylinder, *Interface, *Laminar flow, *Turbulent flow, Concentric, Couette flow, Cylinder, Dispersion, Flow, Laminar, Nose, Spiral, Strip, Tail, Turbulent.

For abstract, see S 04 15.

N66-27185 Field 20D
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
EXPERIMENTAL EVALUATION OF PRESSURANT GAS INJECTORS DURING THE PRESSURIZED DISCHARGE OF LIQUID HYDROGEN.
by R. L. De witt, W. R. Johnson, and R. J. Stochl. Jun 66, 39p NASA-TN-D-3458

Descriptors: *Fuel tank pressurization system, *Gas injection, *Liquid hydrogen, Cryogenic, Discharge, Fluid, Fuel, Gas, Geometry, Hydrogen, Injection, Liquid, Nitrogen, Optimization, Oxygen, Pressurization, Propellant, Tank.

For abstract, see S 04 15.

N66-27498 Field 20D
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Washington, D. C.
MOTION OF TWO PARTS AFTER BURSTING OF A GAS TANK IN A VACUUM.
Dvizheniye Dvukh Chastey Posle Razryva Ob'yema A Gazom V Vakuume
by G. L. Grodzovsky, and F. A. Kukanov. May 66, 15p NASA-TT-F-10135
Transl. Into English From A Russian Publ., 1965

Descriptors: *Force field, *Gas expansion, *Motion equation, *Vacuum effect, Blasius equation, Burst, Effect, Equation, Expansion, Field, Force, Gas, Isotherm, Motion, Tank, Vacuum.

For abstract, see S 04 15.

N66-27499 Field 20D
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Washington, D. C.
PROBLEMS OF OSCILLATIONS OF A FLUID SUBJECTED TO SURFACE TENSION FORCES.
Zadachi Kolebaniy Zhidkosti, Podverzhennoy Silam Poverkhnostnogo Natyazheniya
by F. L. Chernousko, and N. N. Moiseyev. May 66, 45p NASA-TT-F-10141
Transl. Into English From Zh. Vychislitel'noi Mat. I Mat. Fiz. (Moscow), V. 5, No. 6, 1965 P 1071-1095

Descriptors: *Ideal fluid, *Mathematics, *Oscillation, *Surface tension, Axisymmetry, Equilibrium, Field, Fluid, Force, Ideal, Mass, Problem, Surface, Tension, Weightlessness.

For abstract, see S 04 15.

N66-27528 Field 20D
CFSTI Prices HC$4.00 MF$0.75
Advanced Technology Labs., Mountain View, Calif.
RESEARCH ON DIFFUSION OF HYDROGEN THROUGH PALLADIUM-SILVER ALLOY, PHASE 3 FINAL REPORT, APR. 1964 - MAY 1965.
by R. C. Bachmann. 31 May 65, 108p NASA-CR-75435, ATL-D-1306
Contract NAS7-118

Descriptors: *Gaseous diffusion, *Hydrogen, *Palladium alloy, *Silver alloy, Alloy, Attitude, Control, Design, Diffusion, Element, Flow, Gas, Gaseous, Palladium, Satellite, Silver, System, Thrustor.

For abstract, see S 04 15.

N66-27807 Field 20D, 20I
CFSTI Prices HC$2.60 MF$0.50
Hebrew Univ., Jerusalem (Israel). Dept. Of Physics.
ELECTRON DENSITY AND IONIZATION PHENOMENA IN SHOCK WAVES ANNUAL SUMMARY REPORT.
by W. Low. 23 Nov 65, 21p AFOSR-66-0634, AD-631006
Contract AF 61/052/-846

Descriptors: *Electron density, *Flow measurement, *Ionization, *Optical measurement, *Shock wave, Density, Electron, Expansion, Flow, Gas, Mach number, Manufacturing, Measurement, Optical, Phenomenon, Property, Shock, Speed, Taper, Tube, Wave.

For abstract, see S 04 15.

N66-28209 Field 20D
CFSTI Prices HC$3.00 MF$0.75
Von Karman Inst. For Fluid Dynamics, Rhode Saint-genese (Belgium).
A STUDY OF THE BOW SHOCK INDUCED BY SECONDARY INJECTION INTO SUPERSONIC AND HYPERSONIC FLOWS.
by J. L. Evers. 1965, 68p TN-29

Descriptors: *Bow shock, *Flow pattern, *Gas injection, *Hypersonic flow, *Supersonic flow, Blast, Bow, Dynamics, Flat, Flow, Fluid, Gas, Hypersonic, Injection, Jet, Pattern, Plate, Shock, Stream, Supersonic, Wave.

For abstract, see S 04 15.

N66-28219 Field 20D
CFSTI Prices HC$2.00 MF$0.50
Technical Univ. Of Denmark, Lyngby.
ON TURBULENCE IN OPEN CHANNEL FLOW. STATISTICAL THEORY APPLIED TO MICRO-PROPELLER MEASUREMENTS.
by I. G. Jonsson. 1965, 49p CI-31
49 P Refs

Descriptors: *Channel flow, *Propeller, *Variation method, *Velocity measurement, Aluminum, Bed, Channel, Flow, Longitudinal, Measurement, Method, Open, Roughness, Statistical, Steady, Turbulence, Uniform, Variation, Velocity.

For abstract, see S 04 15.

N66-28543 Field 20D
CFSTI Prices HC$2.00 MF$0.50
Trw Systems Group, Redondo Beach, Calif.
AN ANALYTICAL STUDY OF LIQUID OUTFLOW FROM CYLINDRICAL TANKS DURING WEIGHTLESSNESS FINAL REPORT.
by P. G. Bhuta, and L. R. Koval. 1 Jun 66, 46p NASA-CR-54974, TRW-4531-6005-RO-000
Contract NAS3-7931

Descriptors: *Cylindrical tank, *Liquid flow, *Weightlessness, Bottom, Cylinder, Flat, Flow, Fluid, Incompressible, Interface, Inviscid, Liquid, Mechanics, Tank, Vapor.

For abstract, see S 04 16.

N66-29127 Field 20D
CFSTI Prices HC$3.00 MF$0.75
Pisa Univ. (Italy). Inst. Of Aeronautics.
AERODYNAMIC INTERACTION EFFECTS OF A SUPERSONIC AXISYMMETRIC JET EXHAUSTING BELOW A FLAT PLATE INTO A SUPERSONIC FREE STREAM FINAL REPORT.
by M. Marini, and E. Pistolesi. May 65, 54p AD-631556
Contract AF-EOAR-63-97

Descriptors: *Aerodynamics, *Flat plate, *Free stream, *Jet exhaust, *Supersonic flow, Approximation, Axisymmetry, Calculation, Drag, Effect, Exhaust, Flow, Free, Interaction, Interference, Jet, Model, Stream, Supersonic.

For abstract, see S 04 16.

N66-29286 Field 20D
CFSTI Prices HC$1.00 MF$0.50
General Dynamics/convair, San Diego, Calif.
LIQUID OSCILLATIONS AND DAMPING IN A ZERO GRAVITY ENVIRONMENT.
by G. B. Wood. 25 Apr 61, 12p NASA-CR-54999, GD/C-562-1-550
Revised

Descriptors: *Bubble, *Dimensional analysis, *Drop, *Liquid nitrogen, *Scaling law, *Weightlessness, Analysis, Centaur launch vehicle, Dimensional, Environment, Gravity, Kc-135 aircraft, Law, Liquid, Nitrogen, Scaling, Zero.

For abstract, see S 04 16.

N66-29288 Field 20D
CFSTI Prices HC$4.00 MF$0.75
General Dynamics/astronautics, San Diego, Calif.
GENERAL DYNAMICS/ ASTRONAUTICS ZERO- G PROGRAM FINAL REPORT, MAY 1960 - MAR. 1962.
by F. Merino, and J. E. Sherley. 15 Aug 62, 113p NASA-CR-54998, AY-62-0031
Contracts NAS8-2664, AF 18/600/-1775

Descriptors: *Aerobee rocket, *C-131 aircraft, *Centaur launch vehicle, *Kc-135 aircraft, *Weightlessness, Aircraft, Ballistics, Behavior, Cryogenic, Design, Development, Gravity, Heat transfer, Instrumentation, Jet, Launch vehicle, Liquid, Missile, Test, Ventilation, Zero.

For abstract, see S 04 16.

N66-29296 Field 20D
CFSTI Prices HC$3.00 MF$0.75
Massachusetts Inst. Of Tech., Cambridge. Dept. Of Mechanical Engineering.

A NEW FORMULATION OF THE MULTICOMPONENT TRANSPORT EQUATIONS FOR USE IN LAMINAR BOUNDARY LAYER PROBLEMS.
by M. E. Goldstein. May 66, 64p NASA-CR-75819
Contract NGR-22-009-052
Its Fluid Mech. Lab. Publ. No. 66-3

Descriptors: *Chapman-enskog method, *Laminar boundary layer, *Numerical integration, *Transport equation, Algebra, Boundary, Calculation, Combination, Differential, Equation, Flux, Integration, Laminar, Layer, Linear, Numerical, Transport, Variable.

For abstract, see S 04 16.

N66-29383 **Field 20D**
CFSTI Prices HC$2.00 MF$0.50
Michigan Univ., Ann Arbor. Lab. For Fluid Flow And Heat Transport
CAVITATION BUBBLE OBSERVATION IN A VENTURI.
by F. G. Hammitt, and R. D. Ivany. Apr 65, 40p NASA-CR-64682
Grant NSG-39-60, Contract NSF G-22529
Submitted For Publication Its Rept.-03424-25-i

Descriptors: *Bubble, *Collapse, *Incompressible fluid, *Pressure gradient, *Venturi tube, *Water, Cavitation, Comparison, Compression, Direction, Flow, Fluid, Incompressible, Mechanics, Observation, Photographic, Radius, Spherical, Tube, Vapor, Velocity.

For abstract, see S 04 16.

N66-29415 **Field 20D**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
MODULATION AND SAMPLING OF HYDROMAGNETIC RADIATION.
by C. P. Sonett. 1965, 76p NASA-TM-X-56428
Presented At The Cospar- Ursi Symp. On Optimization Of Instrumentation For Space Expt. From The Standpoint Of Data Process., Buenos Aires, May 1965

Descriptors: *Magnetohydrodynamic wave, *Modulation technique, *Radiation field, *Sampling device, Collection, Data, Device, Electromagnetic, Field, Frequency, Hydromagnetic, Modulation, Radiation, Sampling, Sensor, Signal, Spacecraft, Spectrum, Spin, Technique, Vector, Wave

For abstract, see S 04 16.

N66-29420 **Field 20D**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
SIMPLEST PRECISE SOLUTIONS OF THE BOLTZMANN EQUATION FOR RAREFIED GAS FLOWS.
Prosteyshiye Tochnyye Resheniya Uravneniya Bol'tsmana Dlya Dvizheniya Razrezhennogo Gaza
by A. A. Nikolskiy. Aug 63, 7p NASA-TT-F-8622, ST-AGD-10039
Contract NAS5-2078
Transl. Into English From Dokl. Akad. Nauk Sssr (Moscow), V. 151, No. 2, 1963 P 299-301

Descriptors: *Boltzmann equation, *Gas flow, *Monatomic gas, *Rarefied gas, Dimensional, Distribution, Flow, Function, Gas, Monatomic, Natural, Rare, Solution, Space, Three, Velocity.

For abstract, see S 04 16.

N66-29439 **Field 20D**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
DETONATION WAVES IN GASES.
Detonatsionnyye Volny V Gazakh
by R. I. Solovkhin. Feb 64, 49p NASA-TT-F-8803
Transl. Into English From Usp. Fiz. Nauk (Moscow), V. 80, No. 4, Aug. 1963 P 525-551

Descriptors: *Detonation wave, *Gas dynamics, *Measuring apparatus, *Shock front, Apparatus, Chapman-jouget flame, Combustion, Deflagration, Detonation, Dynamics, Flame, Flow, Front, Gas, Ignition, Kinetics, Measurement, Oscillation, Pressure, Shock, Stability, Structure, Velocity, Wave.

For abstract, see S 04 16.

N66-29459 **Field 20D**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
CONTRACT-SURFACE TAILORING IN REAL SHOCK TUBES.
by F. E. Belles, and T. A. Brabbs. 1965, 15p NASA-TM-X-56735
Submitted For Publication

Descriptors: *Equilibrium, *Gas dynamics, *Pressure measurement, *Shock tunnel, Argon, Carbon dioxide, Contact, Dynamics, Gas, Helium, Interaction, Measurement, Nitrogen, Pressure, Shock, Surface, Tailoring, Tunnel.

For abstract, see S 04 16.

N66-29507 **Field 20D**
CFSTI Prices HC$1.00 MF$0.50
General Dynamics/convair, San Diego, Calif.
ZERO- G REPORT, BUBBLE ACCUMULATION IN SIMULATED BOILING.
by L. Mc crary. 1 Jun 62, 18p NASA-CR-75924, GD/C-55D-859-6

Descriptors: *Boiling, *Bubble, *Centaur launch vehicle, *Weightlessness, Drop, Freon, Fuel, Gravity, Hydrogen, Launch vehicle, Liquid, Simulation, Tank, Vapor, Vent, Zero.

For abstract, see S 04 16.

N66-29523 **Field 20D**
CFSTI Prices HC$5.00 MF$1.00
Illinois Univ., Urbana. Coordinated Science Lab.
COORDINATED SCIENCE LABORATORY PROGRESS REPORT FOR DECEMBER 1965, JANUARY, AND FEBRUARY 1966.
1 Apr 66, 151p NASA-CR-75869, AD-631712
Grants NSG-443, NSG-504

Descriptors: *Control system, *Damping, *Electron scattering, Control, Electron, Excitation, Gyro, Material, Mechanical, Nonlinear, Physics, Scattering, Stability, Surface, System, Tungsten, Vibration.

For abstract, see S 04 16.

N66-29730 **Field 20D**
CFSTI Prices HC$3.00 MF$0.50
Georgia Inst. Of Tech., Atlanta. School Of Civil Engineering.
HYDRODYNAMICS OF TIRE HYDROPLANING FINAL REPORT, 1 JUL. 1965 - 30 JUN. 1966.
by C. S. Martin. 1966, 80p NASA-CR-76018
Contracts NGR-11-002-033, B-608

Descriptors: *Aircraft tire, *Hydrodynamics, *Hydroplane, Aircraft, Coefficient, Distribution, Drag, Fluid, Force, Ideal, Lift, Pneumatic, Pressure, Runway, Tire.

For abstract, see S 04 16.

N66-29747 **Field 20D**
CFSTI Prices HC$3.00 MF$0.75
West Virginia Univ., Morgantown. Dept. Of Aero-space Engineering.
AN EXPERIMENTAL STUDY OF VISCOUS-FLOW NOSE-SHAPE EFFECTS OF IMPACT TUBES.
by M. L. Howard. 3 Jan 66, 68p NASA-CR-76025
Grant NSG-533

Descriptors: *Nose inlet, *Pitot tube, *Pressure measurement, *Viscous flow, Flow, Fluid, Inlet, Measurement, Mechanics, Nose, Pitot, Pressure, Shape, Stagnation, Tube, Viscous.

For abstract, see S 04 16.

N66-29970 **Field 20D**
CFSTI Prices HC$1.00 MF$0.50
Catholic Univ. Of America, Washington, D. C. Dept. Of Space Science And Applied Physics.
ON MASS TRANSFER BETWEEN TWO PARALLEL STREAMS.
by V. C. Whang. Jun 66, 22p NASA-CR-76072
Grant NSG-586
Its Rept.-66-007

Descriptors: *Convection, *Diffusion, *Gas stream, *Mass transfer, Boundary, Concentration, Condition, Flow, Gas, Mass, Slip, Stream, Transfer, Transition, Velocity.

For abstract, see S 04 16.

N66-36052 **Field 20D**
CFSTI Prices HC$1.00 MF$0.50
Catholic Univ. Of America, Washington, D. C. Dept. Of Space Science And Applied Physics.
STABILITY OF HELMHOLTZ FLOW IN AN UNSTABLE ATMOSPHERE.
by T. J. Eisler. Aug 66, 16p NASA-CR-77874
Grant NSG-586
Its Rept.-66-011

Descriptors: *Atmospheric turbulence, *Flow velocity, *Helmholtz equation, *Velocity profile, Atmosphere, Density, Equation, Flow, Gradient, Instability, Perturbation, Static, Turbulence, Velocity.

For abstract, see S 04 21.

N66-36113 **Field 20D**
CFSTI Prices HC$3.00 MF$0.75
Research Triangle Inst., Durham, N. C.
NONGREY RADIATION EFFECTS ON THE BOUNDARY LAYER OF AN ABSORBING GAS OVER A FLAT PLATE.
by H. A. Hassan, and A. M. Smith. Sep 66, 109p NASA-CR-576
Contract NAS1-4270

Descriptors: *Absorption coefficient, *Boundary layer, *Flat plate, *Gas dynamics, *Radiation effect, Absorption, Boundary, Coefficient, Dynamics, Effect, Emissivity, Flat, Gas, Layer, Nongray, Optical, Plate, Radiation, Thickness.

For abstract, see S 04 21.

N66-36116 **Field 20D**
CFSTI Prices HC$2.50 MF$0.75
Georgia Inst. Of Tech., Atlanta. School Of Civil Engineering.
HYDRODYNAMICS OF TIRE HYDROPLANING.
by C. S. Martin. Sep 66, 70p NASA-CR-601
Contract NGR-11-002-033

Descriptors: *Aircraft tire, *Hydrodynamics, *Pneumatic equipment, Aircraft, Analysis, Equipment, Force, Pneumatic, Pressure, Runway, Surface, Theoretical, Tire, Water, Wetness.

For abstract, see S 04 21.

N66-36126 Field 20D
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
WEAK LOCALLY HOMOGENEOUS TURBULENCE IN IDEALIZED FLOW THROUGH A CONE.
by R. G. Deissler. Sep 66, 29p NASA-TN-D-3613
Contract 129-01-09-07-22

Descriptors: *Conical flow, *Homogeneous turbulence, *Turbulent flow, Cone, Continuity, Correlation, Equation, Flow, Fluid, Heat, Homogeneity, Ideal, Navier-stokes equation, Transfer, Turbulence, Variance, Velocity, Vorticity, Wall, Weak.

For abstract, see S 04 21.

N66-36129 Field 20D
CFSTI Prices HC$7.00 MF$1.75
Aero Vac Corp., Troy, N. Y.
VACUUM TECHNOLOGY AND SPACE SIMULATION.
by D. H. Holkeboer, D. W. Jones, F. Pagano, and D. J. Santeler. 1966, 331p NASA-SP-105
Contract NASW-680

Descriptors: *Gas flow, *Pressure gauge, *Pumping, *Space simulation, *Vacuum system, Component, Cryogenic, Detection, Equipment, Flow, Gas, Gauge, Leakage, Load, Manual, Measurement, Outgassing, Pressure, Simulation, Space, Speed, System, Technology, Vacuum.

For abstract, see S 04 21.

PB-173 205 Field 20D
CFSTI Prices: HC$34.50 MF$1.75
Michigan Univ., Ann Arbor. Lab. for Fluid Flow and Heat Transport Phenomena.
HIGH SPEED PHOTOGRAPHIC STUDIES OF ULTRASONICALLY-INDUCED CAVITATION AND DETAILED EXAMINATION OF DAMAGE TO SELECTED MATERIALS,
by Hilding G. Olson. Aug 66, 349p Rept. no. 07738-T, Technical rept. TR-2
Grant NSF-GK-730

Descriptors: (*Cavitation, Damage), Hydrodynamics, Ultrasonic radiation, Materials, Photographic analysis, Bubbles.

The purpose of the study is to explore the many facets of cavitation as induced by high frequency vibration in water, and to present a comparison, when possible, to data accumulated from venturi and previous vibratory experiments.

PB-173 206 Field 20D
CFSTI Prices: HC$41.90 MF$2.00
Michigan Univ., Ann Arbor. Lab. for Fluid Flow and Heat Transport Phenomena.
COMPREHENSIVE CAVITATION DAMAGE DATA FOR WATER AND VARIOUS LIQUID METALS INCLUDING CORRELATIONS WITH MATERIAL AND FLUID PROPERTIES,
by Ramon Garcia. Aug 66, 423p Rept. no. 05031-6-T, technical rept. TR-6
Grant NSF-G-22529

Descriptors: (*Cavitation, Damage), Water, Liquid metals, Materials, Fluid dynamic properties, Erosion.

The primary objective of the investigation is to obtain a better basic understanding of the cavitation-erosion phenomenon. This was attained in the following manner: (a) by determining the cavitation resistance of a wide variety of useful materials, which represent a large range of mechanical properties, including stainless steels, carbon steel, tool steels, refractory alloys, aluminum, copper, nickel, brass, plastics, etc., in a broad range of fluids including water at 70F, mercury at 70F and 500F, and lead-bismuth alloy and lithium at 500F and 1500F; (b) by obtaining a comprehensive correlation of the cavitation damage data with applicable material and fluid properties; (c) by developing a relationship between the damage incurred in a flowing venturi device operated by this laboratory and the damage obtained in the accelerated vibratory facility studies which are the subject of this dissertation, so that perhaps the simpler and more economical vibratory facility tests could be substituted with confidence for the more complex but realistic flowing tests; and (d) by developing a practical high-temperature ultrasonic vibratory device for use in this investigation. (Author)

PB-173 217 Field 20D
CFSTI Prices: HC$3.60 MF$0.50
Michigan Univ., Ann Arbor. Lab. for Fluid Flow and Heat Transport Phenomena.
BUBBLE COLLAPSE BEHAVIOR AROUND A SHARP WEDGE IN A DIFFUSER,
by Terry M. Mitchell, Charles L. Kling, and Frederick G. Hammitt. Jul 66, 36p Technical rept., TR-1, Rept. no. 07738-TR-1
Grant NSF-GK-730

Descriptors: (*Diffusers, Bubbles), (*Wedges, Bubbles), Damage, Cavitation, Pressure, Jets.

Two theoretical models attempting to explain the damaging potential of collapsing bubbles are explored. The 'shock' theory assumes that high pressures produced during collapse in the liquid adjacent to the bubble are sufficient to cause damage to nearby solid surfaces. The 'jet' theory assumes that bubbles near solid surfaces collapse asymmetrically into a torus containing a central jet. This jet when properly oriented in the direction of the solid surface is assumed to be the cause of damage. Experimental data consists of high speed photographs of the cavitating field in the vicinity of a solid boundary. Results of bubble collapse analysis support the 'jet' theory of collapse by showing predominantly asymmetrical collapse. (Author)

PB-173 286 Field 20D, 20I
CFSTI Prices: HC$2.00 MF$0.50
Michigan Univ., Ann Arbor. Lab. for Fluid Flow and Heat Transport Phenomana.
A CONDUCTIVITY PROBE FOR THE MEASUREMENT OF LOCAL VOID FRACTIONS IN TWO-PHASE FLOW,
by J. F. Lafferty, and F. G. Hammitt. Sep 66, 36p Technical rept. no. 07738-3-T
Grant NSF-GK-730

Descriptors: (*Two-phase flow, *Probes), Electrical conductance, Measurement.

An electrical conductivity probe was developed which provides a means of accurately measuring local void fractions in two-phase flow. The proposed theory which relates the probe current to the local void fraction is verified experimentally by an independent measurement of the void fraction in an air-water mixture. The void fractions obtained with the probe agree with those calculated from flow rate data to within about plus or minus 25% of the calculated value. However, an empirical modification of the current-void relationship brought this agreement to within plus or minus 8% for void fractions ranging from 0.19 to 0.77. (Author)

AD-468 563 See Field 20I

AD-475 424 See Field 21E

AD-639 858 See Field 20I

AD-639 859 See Field 20I

AD-639 909 See Field 20I

AD-640 187 See Field 13J

AD-640 256 See Field 19D

AD-640 431 See Field 15F

AD-640 492 See Field 22C

BNL-963 See Field 18I

LA-3509 See Field 7D

20E. MASERS AND LASERS

AD-464 480 Field 20E, 20F
CFSTI Price: HC$3.00
American Optical Co., Southbridge, Mass. Research Div.
FIBER OPTIC LASER.
Final technical rept.,
by Elias Snitzer. May 65, 72p
Contract DA-19-020-AMC-0160 (X)
Proj. DA-3209
AROD-3209:3
See also AD-605 431.

Descriptors: (*Lasers, Fiber optics), Neodymium, Fluorescence, Glass, Atomic energy levels, Absorption spectrum, Pumping (Electronics).

Problems of frequency control of a neodymium glass laser and the broadening mechanisms involved in neodymium fluorescence and laser action in glass are considered. It is found that laser emission can be obtained in narrow lines less than 0.1A wide anywhere within 130A wide interval centered about the peak emission at 1.0585A by the use of thin reflecting plates acting as wavelength sensitive mode selectors. Spontaneous emission of Nd3+ in glass at 1.06 micron has a full width at half maximum of 180A, which is nearly independent of temperature-. From time resolved spectral studies of clad rods as functions of pump power, temperature, Nd3+concentration, and cavity Q, it is concluded that the 180A wide line consists of overlapping ligand field split lines, the central portion of which has a half width of approximately 65A. From the hole burning observed in the time resolved spectra the homogeneous line width at room temperature is about 20A and reduces to 5A at 77 K. (Author)

AD-639 730 Field 20E
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
MOVING STRIATIONS AND CATAPHORETIC EFFECTS IN A He-Ne LASER,
by A. Garscadden. 17 Jan 66, 5p ARL-66-0168
Proj. AF-7073
Availability: Published in Applied Physics Letters v8 n4 p85-7 Feb 15 1966.

Descriptors: (*Lasers, *Electrophoresis), Stability, Plasma medium, Gas ionization, Motion, Gas discharges, Helium, Neon.

Identifiers: Plasma striations.

The report presents some measurements of the consequences of cataphoresis in a He-Ne laser, including its influence on the moving striations and associated 'noise' occurring in the discharge. Both the cataphoresis and the moving striations are shown to affect the laser output. (Author)

AD-639 850 Field 20E
Not available from CFSTI.
California Univ., San Diego, La Jolla. Inst. for Radiation Physics and Aerodynamics.
LINEAR INSTABILITY THEORY OF LASER PROPAGATION IN FLUIDS.
by K. A. Brueckner, and S. Jorna. 2 Jun 66, 4p
Contract DA-31-124-ARO (D)-257
AROD-5133:42
Availability: Published in Physical Review Letters v17 n2 11 Jul 1966.

Descriptors: (*Lasers, Propagation), Fluids, Stability, Sound, Linear systems, Theory, Mathematical analysis.

Identifiers: Brillouin scattering.

The process considered is essentially that of stimulated Brillouin scattering, but with the reverse effect of the sound wave on the laser wave--by the varying induced dipole moment density--taken into account. It was demonstrated that the light-medium coupling can lead to rapidly growing instabilities, and hence to large density fluctuations. Any small-scale structure in the laser beam, either present initially or caused by inhomogeneities in the medium, will thereby be enhanced, resulting in large intensity changes and so in anomalous gain. (Author)

AD-639 968 **Field 20E, 5H**
CFSTI Prices: HC$3.00 MF$0.75
Hughes Research Labs., Malibu, Calif.
SELECTIVE ACCESS LASER DISPLAY BEAM POSITIONER.
Quarterly rept. no. 1, 1 Mar-31 May 66,
by J. F. Lotspeich, W. P. Brown Jr, R. G. Dixon, J. E. Kiefer, and R. G. Phelps Jr. Aug 66, 64p
Contract AF 30 (602)-4097
Proj. AF-5597
Task 559703
RADC-TR-66-447
Prepared in cooperation with Hughes Aircraft Co., Fullerton, Calif. Ground Systems Group.

Descriptors: (*Lasers, Viewing screens), Command + control systems, Deflection, Display systems, Images, Human engineering.

The objective of the contract is to investigate, theoretically and experimentally, techniques for achieving a high-speed, two-dimensional deflection of a cw visible laser beam. Specifically, this effort is directed toward meeting the requirements of a selective access laser display beam positioner which is capable of presenting a flexible format and multi-color image for a large screen tactical display in Air Force command and control centers. (Author)

AD-640 032 **Field 20E, 20A, 20L, 20I K**
CFSTI Prices: HC$1.00 MF$0.50
Microwave Lab., Stanford Univ., Calif.
MICROWAVE RESEARCH.
Quarterly status rept. no. 30, 1 May-31 Jul 66.
Aug 66, 16p ML-1464
Contract Nonr-225 (48)
Proj. NR-373-361
See also AD-636 090.

Descriptors: (*Microwave frequency, Scientific research), (*Acoustics, Amplifiers), (*Lasers, Scientific research), Semiconductors, Oscillation, Plasma physics, Theory, Ferromagnetic materials.

A report is given on the following projects: electroacoustic amplifiers, optical maser research, stimulated raman effect, geometrical optics of acoustic waves, oscillations in semiconductors, theory of nonuniform plasmas, bulk instabilities in ferromagnetic metals.

AD-640 143 **Field 20E, 20F**
CFSTI Prices: HC$2.00 MF$0.50
Electronic Defense Labs., Sylvania Electronic Systems-West, Mountain View, Calif.
TECHNIQUES FOR SUPER-MODE OSCILLATION.
Interim engineering rept. no. 5, 1 Jul-30 Sep 66,
by Russell Targ, and J. M. French. 30 Sep 66, 36p
Contract AF 33 (615)-2884
See also AD-633 014.

Descriptors: (*Lasers, Frequency modulation), Automatic frequency control, Stabilization systems, Servomechanisms, Monochromatic light, Demodulation.

Construction of an automatic frequency control system for the absolute frequency stabilization of our 2-meter long, 50 mw FM laser was completed. The FM laser produces an error signal which increases as the laser frequency drifts with respect to the center of the Doppler-broadened fluorescence line. The electrical phase of the error signal changes by 180 degrees as the laser drifts from one side of line center to the other. The servo-system generates a control signal of the appropriate magnitude and sign to move a laser mirror attached to a piezoelectric crystal, and cancels any tendency of the laser frequency to drift from line center. The discontinuous 180-degree change of phase in the error signal at line center was measured. The profile of the extremely sharp discriminant was measured and shown to agree satisfactorily with that predicted by theory. The FM laser controlled by this servo-system was demodulated by means of optical heterodyne detection by photomixing with a laser of known stability. This photomixing experiment showed that the FM laser is, at present, absolutely stabilized to within 1.5 MHz of line center. Work is now under way to improve this preliminary figure.

AD-640 149 **Field 20E, 20A, 20I, 20L K**
CFSTI Prices: HC$1.00 MF$0.50
Microwave Lab., Stanford Univ., Calif.
MICROWAVE RESEARCH.
Quarterly status rept. no. 29, 1 Feb-30 Apr 66,
by M. Chodorow. May 66, 23p ML-1436
Contract Nonr-225 (48)

Descriptors: (*Microwave frequency, Scientific research), (*Acoustics, Amplifiers), (*Lasers, Scientific research), Plasma physics, Theory, Ferromagnetic materials, Semiconductors, Oscillation, Piezoelectric crystals.

Topics included are: Acoustic wave amplification studies, optical maser research, tunable lasers, geometrical optics of acoustic waves, oscillations in semiconductors, theory of nonuniform plasmas, bulk instabilities in ferromagnetic metals.

AD-640 249 **Field 20E**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
CALCULATION OF A MONO-PULSE OF A QUANTUM GENERATOR AT INSTANTANEOUS CONNECTION OF INTERFEROMETER,
by A. M. Samson, and V. A. Savva. 25 Apr 66, 10p FTD-TT-65-2001
TT-66-61809
Unedited rough draft trans. of Akademiya Navuk BSSR, Minsk. Doklady, v9 n1 p22-6 1965.

Descriptors: (*Lasers, *Interferometers), Atomic energy levels, Pumping (Optical), Mirrors, Reflection, USSR.

Formulae are given which permit the evaluation of some basic characteristics of a mono-pulse quantum generator (laser) connected to an interferometer in relation to population inversion, pumping power, mirror reflectivity, and other parameters.

AD-640 439 **Field 20E, 14E**
CFSTI Prices: HC$2.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J.
INTERFEROMETRIC PHOTOGRAPHIC TECHNIQUES FOR RECORDING OPTICAL PATH LENGTH VARIATIONS IN PUMPED LASER RODS.
Technical rept.,
by Charles J. Bickart. Aug 66, 28p ECOM-2751
Proj. DA-1E622001A056
Task 1E622001A056-03-13

Descriptors: (*Lasers, High-speed photography), Interferometers, Rods, pumping (Optical), Doping, Optical properties, High-speed cameras, Glass, Neodymium, Ruby.

The report describes some unique photographic techniques developed during an investigation of thermal effects occurring in solid-state l.ser materials (Nd (+++) glass and ruby) during the pumping period. An experimental approach is described for the investigation of the interaction of a high-energy laser beam with the atmosphere. Two novel high-speed cameras designed specifically for these investigations are discussed in detail. Experimental results are shown from which conclusions concerning optimum pumping arrangements, rod characteristics, and doping concentrations can be drawn. (Author)

AD-640 481 **Field 20E, 9A**
CFSTI Prices: HC$1.00 MF$0.50
Army Electronics Command, Fort Monmouth, N. J.
INJECTION LASER DRIVING CIRCUIT FOR HIGH-CURRENT, HIGH-REPETITION-RATE OPERATION.
Technical rept.,
by Rudolph R. Gammarino, Ernst J. Schiel, and Gerald A. Talbot. Aug 66, 21p ECOM-2753
Proj. DA-1L0-13001A91A
Task 1L0-13001A91A-39

Descriptors: (*Lasers, Circuits), (*Circuits, Pulse generators), Silicon controlled rectifiers, Pulse modulation, Solid state physics, Diodes (Semiconductor), Pulse systems.

The report describes a high current solid-state pulser that has been developed to drive injection lasers for room-temperature operation. Two basic charging circuits are detailed, and the advantages and disadvantages of each are analyzed. The discharge circuit is described, and the factors in the discharge circuit which determine the peak current and pulse width are investigated. The performance of the various solid-state switching devices, silicon-controlled rectifiers (SCR's), employed in the circuit is also discussed. (Authors)

NYO-3330-11 **Field 20E**
CFSTI Prices: HC$4.00 MF$0.75
Radioptics, Inc., Plainview, N. Y.
NUCLEAR RADIATION PROCESSING OF OPTICAL MASER MATERIALS,
by Henry Sadowski, Kalman Held, and James Beckerley. 17 Mar 66, 107p
Contract AT (30-1)-3330

Descriptors: (*Radiation damage, *Lasers).

For abstract, see N 20 20.

N66-27953 **Field 20E**
CFSTI Prices HC$3.00 MF$0.75
Sylvania Electric Products, Inc., Mountain View, Calif. Electronic Defense Labs.
STUDY OF VIBRATION MEASUREMENT BY LASER METHODS.
by G. A. Massey. 1965, 68p NASA-CR-75643
Contract NAS2-3137

Descriptors: *Laser, *Spacecraft model, *Vibration measurement, Detection, Displacement, Gradient, Holography, Interference, Mapping, Measurement, Microwave, Model, Reflection, Shaker, Spacecraft, Table, Testing, Vibration.

For abstract, see S 04 15.

N66-28382 **Field 20E**
CFSTI Prices HC$5.00 MF$1.00
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
LASIG II - PULSED LASER ION GENERATOR STUDY FINAL REPORT.
by R. E. Biss, and A. S. Gilmour Jr. 5 Oct 65, 123p NASA-CR-54154, CAL-UB-1989-E-4
Contract NAS3-5919

Descriptors: *Ion current, *Pulsed laser, *Ruby laser, Current, Density, Emission, Energy, Focus, Generation, Ion, Laser, Output, Pulse, Ruby.

For abstract, see S 04 15.

N66-29428 Field 20E
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
OPTICAL LOCATION OF THE MOON.
Ob Opticheskoy Lokatsii Luny
by N. S. Chernykh, K. K. Chuvayev, A. Z. Grasyuk, YU. L. Kokurin, and P. G. Kryukov. May 64, 6p NASA-TT-F-8866
Transl. Into English From Dokl. Akad. Nauk Sssr (Moscow), V. 154, No. 6, 1964 P 1303-1305 Presented At The Joint Colloq. Of The Oscillations Lab. Of Quantum Radiophysics, Ussr, 28 Sep. 1963

Descriptors: *Lunar disk, *Optical rangefinder, *Ruby laser, Crater, Disk, Electron, Laser, Lens, Light, Location, Lunar, Mirror, Noise, Optical, Photomultiplier, Pulse, Rangefinder, Reflection, Ruby, Signal, Surface, Telescope, Wavelength.

For abstract, see S 04 16.

N66-35687 Field 20E
CFSTI Prices HC$2.50 MF$2.50
National Aeronautics And Space Administration, Washington, D. C.
LASERS AND MASERS - A CONTINUING BIBLIOGRAPHY WITH INDEXES, FEBRUARY - APRIL 1966.
Jul 66, 465p NASA-SP-7009/01/

Descriptors: *Abstract, *Bibliography, *Laser, *Maser, Astronomy, Chemical, Communications, Device, Gas, Infrared, Liquid, Metallurgy, Mode, Optics, Organic, Proton, Pulse, Radar, Ranging, Resonator, Ruby, Semiconductor, Solid, State, Travel, Wave.

For abstract, see S 04 21.

N66-36261 Field 20E
CFSTI Prices HC$1.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge. Research Lab. Of Electronics»
SENSING OF METEOROLOGICAL VARIABLES BY LASER PROBE SEMIANNUAL REPORT, 1 FEB. - 31 JUL. 1966.
by G. Fiocco. 1 Aug 66, 8p NASA-CR-77909
Contracts NGR-22-009-131, NGR-22-009-114

Descriptors: *Laser, *Meteorology, *Sensing, Aerosol, Analysis, Argon, Atmosphere, Computer, Dust, Ionization, Light, Optical, Probe, Radar, Scattering, Upper, Variable.

For abstract, see S 04 21.

N66-36387 Field 20E
CFSTI Prices HC$1.00 MF$0.50
Varian Associates, Beverly, Mass. Quantum Electronics Div.
RESEARCH LEADING TO PRACTICAL RUBIDIUM MASER OSCILLATORS FINAL REPORT.
8 Mar 66, 17p NASA-CR-77924
Contract NAS5-9607

Descriptors: *Maser, *Optical pumping, *Oscillator, Density, Intensity, Laboratory, Light, Optical, Pumping, Rubidium, Theory.

For abstract, see S 04 21.

PB-170 901 Field 20E, 17H
CFSTI Prices: HC$1.00 MF$0.50
Smithsonian Astrophysical Observatory, Cambridge, Mass.
PHOTOGRAPHIC MEASUREMENTS OF THE ENERGY DISTRIBUTION IN THE BEAM OF A RUBY LASER.
Special rept. on Research in Space Science.
by C. G. Lehr, L. A. Maestre, and P. H. Anderson. 25 Mar 66, 20p 1-66-25, SAO-SR-205
Grant NsG-87-60

Descriptors: (*Opdar, Lasers), (*Lasers, Energy), Ruby, Distribution, Photographic images, Targets, Photographic film, Photometers, Satellite tracking systems.

The beam of a Q-switched ruby laser was directed toward a diffusely reflecting target at a distance of about 1/2 mile. The image on the target was photographed with a hand camera and the resulting films were measured with a microdensitometer. Two stop-openings were used for the photographs. The films exposed with the smaller stop-opening showed concentrations of energy with intensities up to 700 times the background energy. These concentrations are probably representative of the actual laser beam but they could be diffraction effects caused by irregularities in the surface of the diffuse target. The films exposed with the larger stop-opening were used to measure this background energy. Its average value was about half the nominal value of the energy determined from calorimetric measurements. This factor of one-half may be the combined effect of several losses that were neglected in the photometric measurements. The angular divergence of the beam was also measured. (Author)

AD-639 852 See Field 20C

AD-640 097 See Field 11B

AD-640 262 See Field 17I

AD-640 497 See Field 22A

20F. OPTICS

AD-471 160 Field 20F
CFSTI Prices: HC$6.00 MF$1.25
Royal Aircraft Establishment, Farnborough (England).
SOME ASPECTS OF MODERN OPTICS,
by M. H. A. Deller, and A. C. Marchant. Feb 65, 260p Technical rept. TR-65012

Descriptors: (*Optics, Textbooks), Light, Energy, Quantum mechanics, Monochromatic light, Optical images, Diffraction, Schlieren photography, Lenses, Luminescence, Fiber optics, Reflection, Refraction, Distortion, Great Britain.

This report is based on a series of lectures given at the R.A.E. The lectures were designed for junior scientific staff within the M.O.A., who were ostensibly without special optical training, and generally at the post-graduate level. (Author)

AD-639 661 Field 20F, 11F, 22B, 8G K
CFSTI Prices: HC$3.00 MF$0.75
Aerospace Technology Div., Library of Congress, Washington, D. C.
FOREIGN SCIENCE BULLETIN, VOL. 2, NO. 9.
Sep 66, 67p
TT-66-62368
A Monthly Review of Selected Foreign Scientific and Technical Literature. See also AD-637 218.

Descriptors: (*Light transmission, Waveguides), (*Liquid metals, Compatibility), Fiber optics, Molecular association, Space biology, Lasers, Moon, Geophysics, Geology, Radioactive fallout, Ramjet engines, Transducers, Tracking, Seismic waves, Scientific personnel, Control systems, Aerial photographs, USSR.

Identifiers: Focons.

Contents. Full length papers: Sunshine on tap: the focon; Relationship between interatomic reactions and adsorption-induced strength deterioration under the effect of liquid metals. Science and technology notes: Soviet biosatellite program; Laser ranging of the moon; Mathematical and computer techniques in Soviet geophysics and geology; Formation of radioactive fallout and isotope fractionation during the Sedan cratering nuclear explosion; Calculation of the minimum length of a supersonic ramjet engine combustor; An electropneumatic transducer; Satellite and meteor tracking. Conferences: Seminar on multiple reflected waves. Science personalities: Alesandr Mikhaylovich Prokhorov. Book reviews: Theory of optimal control of distributed parameter systems; Theory and practice of decoding aerial photographs.

AD-640 181 Field 20F, 14B
Not available from CFSTI.
Arkansas Univ., Fayetteville. Dept. of Physics.
SIMPLE NANOSECOND LIGHT PULSER.
Revised ed.,
by W. R. Pendleton Jr. 22 Jul 65, 3p
Grant AF-AFOSR-62-159
AFOSR-66-1568
Revision of manuscript submitted 7 Dec 64.
Availability: Published in The Review of Scientific Instruments v36 n11 p1645 Nov 1965.

Descriptors: (*Light pulses, *Pulse generators), Sources, Phosphorescent materials, Thyratrons, Subminiature electron tubes, Voltage.

A voltage indicator tube, Amperex 6977, was used as a nanosecond light pulser using a miniature hydrogen thyratron pulser. An analysis of the emission of the fast component of the two-component P-15 phosphor showed a decay to 10% of original light peak intensity in not more than 50 nanoseconds. Best light pulse shapes showed 3.5 ns rise to 90% of peak intensity and 7 ns width at the one-half intensity points. (Author)

AD-640 254 Field 20F
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ACCUMULATION AND CONSUMPTION OF RADIATION IN A LAYER USING SEPARABLE MIRRORS.
by A. M. Samson. 18 Apr 66, 8p FTD-TT-65-1379
TT-66-62418
Unedited rough draft trans. of Akademiya Navuk BSSR, Minsk. Vestsi. Seryya Fizika-Tekhnichnykh Navuk, n3 p129-31 1964.

Descriptors: 3 Mirrors, Reflection), (*Electromagnetic waves, Consumption), USSR.

AD-640 301 Field 20F
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
DIFFUSE TRANSMISSION OF LIGHT FROM A CENTRAL SOURCE THROUGH AN INHOMOGENEOUS SPHERICAL SHELL WITH ISOTROPIC SCATTERING,
by R. E. Bellman, H. H. Kagiwada, R. E. Kalaba, and S. Ueno. Sep 66, 18p RM-5126-PR
Contract AF 49 (638)-1700

Descriptors: (*Light transmission, Spheres), Diffusion, Partial differential equations, Numerical methods and procedures, Light, Differential equations.

A partial differential integral equation is derived for the angular distribution of the radiation which is diffusely transmitted through an inhomogeneous, isotropically scattering, spherical shell when there is a constant net flux of radiation normally incident on the inner surface. An equation is also derived for the strength of the diffusely reflected radiation when the shell is illuminated at each point on the outer surface by constant isotropic incident radiation. The equations obtained appear to lend themselves well to numerical solution. Astrophysically, the situation corresponds to determining the brightness of a spherical planetary nebula. As far as is known, the equations are new and exact. (Author)

AD-640 395 **Field 20F**
CFSTI Prices: HC$2.00 MF$0.50
Rochester Univ., N. Y. Inst. of Optics.
THE ORTHONORMALIZATION OF ABERRATIONS,
by H. A. Unvala. 8 Jul 66, 37p
Contract DA-30-069-AMC-534 (A)
Prepared for presentation at the International Conference on Lens Design with Large Computers, Rochester, New York, Jul 5-8, 1966.

Descriptors: (*Lenses, Design), (*Optical equipment, Corrections), Least squares method.

Identifiers: Aberrations.

AD-640 396 **Field 20F, 9B**
Not available from CFSTI.
Rochester Univ., N. Y. Inst. of Optics.
WHAT MODERN COMPUTERS HAVE DONE TO LENS DESIGN.
Technical paper,
by Robert E. Hopkins, and Hoshang A. Unvala.
Aug 66, 18p
Research sponsored in part by AFSC.
Availability: Published in Society of Photo-optical Instrumentation Engineers Annual Technical Symposium (11th), St. Louis, Mo., Aug 22-26 1966.

Descriptors: (*Lenses, Design), (*Programming (Computers), Optics industry).

N66-27046 **Field 20F**
CFSTI Prices HC$7.00 MF$2.00
Farrand Optical Co., Inc., New York.
VIRTUAL IMAGE OUT-THE-WINDOW DISPLAY SYSTEM STUDY, VOLUME I.
by M. Baum, R. Bull, J. La russa, L. Mayer, and M. Shenker. Jan 66, 386p NASA-CR-65367
Contract NAS9-3678

Descriptors: *Display system, *Image intensifier, *Simulation, *Visual display, Configuration, Display, Dissection, Electronic, Generator, High resolution, Image, Infinity, Instrumentation, Intensifier, Laser, Orthicon, System, Television, Tube, Virtual, Visibility, Visual.

For abstract, see S 04 15.

N66-27231 **Field 20F**
CFSTI Prices HC$3.00 MF$0.75
Geophysics Corp. Of America, Bedford, Mass. Technology Div.
DEVELOPMENT OF A MASS SPECTROMETER EMPLOYING A PHOTOIONIZATION SOURCE.
by A. F. Barrington, and W. P. Poschenrieder. Feb 66, 67p NASA-CR-66100, GCA-TR-66-3-N
Contract NAS1-4927

Descriptors: *Gas analyzer, *Ion source, *Mass spectrometer, *Photoionization, Analyzer, Design, Detection, Gas, Impurity, Ion, Ionization, Light, Mass, Monochromator, Source, Spectrometer, Trace, Ultraviolet, Vacuum.

For abstract, see S 04 15.

N66-27527 **Field 20F**
CFSTI Prices HC$3.00 MF$0.75
Westinghouse Electric Corp., Baltimore, Md. Aerospace Div.
RESEARCH ON A PASSIVE MODULATION INDUCING RETRODIRECTIVE OPTICAL SYSTEM (MIROS) FINAL REPORT, 20 MAY 1963 - 20 JUN. 1964.
1964, 92p NASA-CR-75433
Contract NASW-703

Descriptors: *Light modulator, *Mercury vapor, *Modulation inducing retrodirective optical system p, *Optical pumping, *Potassium iodide, Absorption, Alkali, Beam, Element, Frequency, Halide, Induction, Iodide, Light, Mercury, Modulation, Modulator, Optical, Passive, Potassium, Pumping, Resonance, Retrodirecting, Spectrum, System, Theory, Transfer, Vapor.

For abstract, see S 04 15.

N66-27935 **Field 20F**
CFSTI Prices HC$1.00 MF$0.50
Kansas Univ., Lawrence. Center For Research In Engineering Science.
EXACT SOLUTION TO THE SCATTERING OF WAVES FROM A ROUGH SURFACE.
by A. K. Fung. 1964, 15p NASA-CR-75616, CRE-481
Grant NSG-298, Contract NSF GP-2259

Descriptors: *Dirichlet problem, *Neumann problem, *Surface roughness, *Wave scattering, Arbitrary, Function, Illumination, Problem, Roughness, Scalar, Scattering, Series, Solution, Surface, Wave.

For abstract, see S 04 15.

N66-27938 **Field 20F**
CFSTI Prices HC$3.00 MF$0.75
Virginia Univ., Charlottesville. Leander Mc Cormick Observatory.
DESIGN AND APPLICATIONS OF OPTICAL INTERFEROMETERS IN ASTRONOMY FINAL REPORT.
by L. Frederick, P. H. Knappenberger Jr, and H. J. Wood III. 1966, 76p NASA-CR-75634
Contract NGR-47-005-031

Descriptors: *Astronomy, *Interferometry, *Prism, *Telescope, Aberration, Astigmatism, Beam, Collimation, Diameter, Front, Interferometer, Observatory, Optical, Shear, Spherical, Stellar, Wave.

For abstract, see S 04 15.

N66-28045 **Field 20F**
CFSTI Prices HC$1.00 MF$0.50
National Bureau Of Standards, Washington, D. C. Metrology Div.
A NEW PHOTOELECTRIC FILTER SPECTRORADIOMETER AND ITS USE IN SPECTRAL SOLAR IRRADIANCE MEASUREMENTS AT TABLE MOUNTAIN.
by R. Stair, and W. R. Waters. 1965, 22p NASA-CR-75551, NBS-9300
NASA ORDER R-116

Descriptors: *Filter, *Interference, *Solar radiation, *Ultraviolet radiation, Band, High, Irradiation, Measurement, Narrow, Radiation, Solar, Spectral, Spectroradiometer, Transmission, Ultraviolet.

For abstract, see S 04 15.

N66-28153 **Field 20F**
CFSTI Prices HC$2.00 MF$0.50
Istituto Superiore Di Sanita, Rome (Italy). Laboratori Di Fisica.
AUTORADIOGRAPHIC EXPERIMENTS IN THE ELECTRON MICROSCOPE USING THE TECHNIQUE OF SALPETER AND BACHMANN.
Prove Di Autoradiografia Al Microscopio Elettronico Secondo La Tecnica Di Salpeter E Bachmann
by F. R. Valente. 17 Feb 66, 39p ISS-66/5
In Italian, English Summary Sponsored By The Consiglio Nazl. Delle Ric.

Descriptors: *Autoradiography, *Electron microscope, *Resolution, Electron, Emulsion, Experiment, Limit, Microscope, Microscopy, Nuclear, Sensitivity, Technique.

For abstract, see S 04 15.

N66-28197 **Field 20F**
CFSTI Prices HC$2.00 MF$0.50
Istituto Superiore Di Sanita, Rome (Italy). Laboratori Di Fisica.
LECTURES ON ELECTRON MICROSCOPY, I - INTRODUCTION TO ELECTRON MICROSCOPE- FUNDAMENTAL PRINCIPLES AND ELECTRON MICROSCOPE DESIGN.
by R. W. Horne. 23 Jun 65, 34p ISS-65/23

Descriptors: *Control device, *Electron microscope, *Microscopy, Apparatus, Conference, Construction, Control, Design, Device, Electron, Instrument, Microscope, Operation, Principle.

For abstract, see S 04 15.

N66-29304 **Field 20F**
CFSTI Prices HC$2.00 MF$0.50
Bell And Howell Research Center, Pasadena, Calif.
A STUDY OF THE INTRODUCTION OF IONS INTO THE REGION OF STRONG FIELDS WITHIN A QUADRUPOLE MASS SPECTROMETER THIRD QUARTERLY PROGRESS REPORT, 17 FEB. - 17 MAY 1966.
by W. M. Brubaker. 1966, 36p NASA-CR-75843
Contract NASW-1298

Descriptors: *Electric field, *Ion, *Mass spectrometer, *Quadrupole, *Stainless steel, Ac, Alternating, Current, Dc, Direct, Electric, Field, High intensity, Mass, Ratio, Rod, Spectrometer, Stainless, Steel.

For abstract, see S 04 16.

N66-29328 **Field 20F**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A DOUBLE FOCUSING MAGNETIC MASS SPECTROMETER FOR SATELLITE USE.
by L. G. Hall, and C. A. Reber. 1965, 39p NASA-TM-X-56446
Submitted For Publication

Descriptors: *Explorer xvii satellite, *Mass spectrometer, *Upper atmosphere, Atmosphere, Double, Focusing, Geometry, Interaction, Ion, Magnetic, Mass, Spectrometer, Surface, Upper, Velocity.

For abstract, see S 04 16.

N66-29412 **Field 20F**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOME FABRICATION TECHNIQUES OF SPECTRAL LAMPS AND GAS ABSORPTION CELLS FOR RUBIDIUM MAGNETOMETERS.
by H. L. Hoyt. Jun 65, 20p NASA-TM-X-56709, X-612-65-235
Presented At The 10th Ann. Symp. And Exhibition Of The Am. Sci. Glassblowers Soc. Submitted For Publication

Descriptors: *Gas cell, *Lamp, *Magnetometer, *Optical absorption, *Rubidium, Absorption, Cell, Cold, Fabrication, Gas, Liquid, Metal, Nitrogen, Optical, Spectral, Storage, Trap, Vapor.

For abstract, see S 04 16.

N66-29429 **Field 20F**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Washington, D. C.
A NEW HIGHLY LUMINOUS MASS SPECTROMETER FOR MEASURING THE COMPOSITION OF THE UPPER ATMOSPHERE TECHNICAL NOTE NO. T 8/61.
Ein Neues Lichtstarkes Massenspektrometer Zur Messung Der Zusammensetzung Der Hohen Atmosphare
by J. Geerk. Apr 64, 16p NASA-TT-F-8857
Transl. Into English From A Publ. Of The Deutsch-franzosisches Forschungsinstitut, Saint-louis (France), 29 Jun. 1962

Descriptors: *Ion source, *Mass spectrometer, *Optics, *Upper atmosphere, Atmosphere, Blurring, Composition, Dispersion, Energy, Error, Image, Ion, Mass, Opening, Source, Spectrometer, Upper.

For abstract, see S 04 16.

N66-29434 **Field 20F**
CFSTI Prices HC$1.00 MF$0.50
Arizona Univ., Tucson. Dept. Of Physics.
A COMMERCIAL SPECTROMETER MODIFIED FOR X-RAY SPECTROSCOPY OF THE LIGHT ELEMENTS.
by F. D. Davidson, and R. W. Wyckoff. 1964, 9p NASA-CR-60405
Grant NSG-120

Descriptors: *Light element, *Spectrometer, *X-ray fluorescence spectroscopy, Aluminum, Analysis, Boron, Element, Excitation, Fluorescence, Gas, Ka-band, Light, Modification, Spectroscopy, Tube, Vacuum, Wavelength, X-ray.

For abstract, see S 04 16.

N66-29476 **Field 20F**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
EXTRATERRESTRIAL APPLICATION OF X-RAY DIFFRACTION.
by H. K. Herglotz. 20 Apr 66, 46p NASA-TM-X-53449

Descriptors: *Extraterrestrial environment, *Lunar surface, *X-ray diffraction, Camera, Detector, Diffraction, Earth, Environment, Exploration, Extraterrestrial, Lunar, Solid, Spectrograph, Spectrometer, Spectrum, State, Surface, X-ray.

For abstract, see S 04 16.

N66-29972 **Field 20F**
CFSTI Prices HC$3.00 MF$0.50
Itt Federal Labs., San Fernando, Calif.
STUDY OF PROPAGATION OF COHERENT RADIATION AT VISIBLE OR NEAR VISIBLE WAVELENGTHS THROUGH THE ATMOSPHERE INTERIM REPORT, OCT. 1963 - OCT. 1964.
by J. M. Grant. Oct 64, 59p NASA-CR-76078
Contract NAS8-11103

Descriptors: *Atmospheric condition effect, *Coherent light, *Laser, *Light transmission, *Optical heterodyne, Aperture, Atmospheric, Beam, Coefficient, Coherence, Condition, Correlation, Effect, Fog, Heterodyne, Light, Optical, Propagation, Receiver, Simulation, Transmission.

For abstract, see S 04 16.

N66-35591 **Field 20F**
CFSTI Prices HC$2.00 MF$0.50
Arkansas Univ., Little Rock. Graduate Inst. Of Technol.
BASIC EXPERIMENTAL RESEARCH LEADING TO IMPROVED COLD ELECTRON SOURCES AND NEW TYPES OF VELOCITY FILTER MASS SPECTROMETERS FINAL REPORT.
by M. K. Testerman. 10 Apr 64, 34p NASA-CR-56103
Grant NSG-153-61

Descriptors: *Electron ionization, *Electron source, *Gaseous ionization, *Mass spectrometer, Cold, Cycle, Duty, Electron, Filter, Gas, Gaseous, Ionization, Long, Mass, Molecule, Neutral, Research, Source, Space, Spectrometer, Velocity.

For abstract, see S 04 21.

N66-35650 **Field 20F**
CFSTI Prices HC$2.00 MF$0.50
Astro Research Corp., Santa Barbara, Calif.
SOME PRELIMINARY DESIGN STUDIES FOR A VERY LARGE ORBITING RADIOTELESCOPE.
by W. M. Robbins Jr. Sep 66, 49p NASA-CR-573
Contract NASW-652

Descriptors: *Gravitational effect, *Parabolic reflector, *Radio telescope, *Reflecting telescope, Accuracy, Effect, Electric, Gradient, Grating, Gravity, Grid, Load, Membrane, Orbital, Parabolic, Radio, Reflector, Resistance, Size, Stress, Surface, Telescope.

For abstract, see S 04 21.

N66-35663 **Field 20F**
CFSTI Prices HC$3.00 MF$1.00
Avco Corp., Wilmington, Mass. Research And Technology Labs.
FEASIBILITY STUDY OF AN OPTICAL RADIOMETER FOR DETERMINING THE COMPOSITION OF THE MARS ATMOSPHERE FROM SHOCK LAYER RADIATION DURING ENTRY, VOLUME II FINAL REPORT.
by J. A. Hull, R. N. Schweiger, and J. Shumsky. May 66, 129p NASA-CR-73027
Contract NASW-1208

Descriptors: *Instrumentation, *Mars atmosphere, *Radiation, *Radiometer, *Shock layer, Atmosphere, Calibration, Configuration, Design, Entry, Feasibility, Filter, Layer, Mars, Optical, Sensor, Shock.

For abstract, see S 04 21.

N66-35781 **Field 20F**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
CORRECTIONS FOR LINE-OF-SIGHT VELOCITIES ON ACCOUNT OF THE DAILY ROTATION AND ANNUAL REVOLUTION OF THE EARTH DURING SOLAR OBSERVATIONS.
O Popravkakh Luchevykh Skorostey Za Schet Sutochnogo Vrashcheniya I Godichnogo Obrashchenia Zemli Pri Nablyudeniyakh Solntsa
by P. KH.Salman-zade. 24 Mar 66, 14p NASA-CR-77702, ST-SPHA-10461
Contract NAS5-9299
Transl. Into English From Vestn. Leningr. Univ., Ser. Mat., Mekh. I Astron. (Leningrad), No. 1, Ser. 1, 1966 P 166-171

Descriptors: *Earth rotation, *Line spectrum, *Sight line, *Solar spectrum, *Velocity measurement, Correction, Earth, Line, Measurement, Motion, Observation, Ray, Revolution, Rotation, Sight, Solar, Spectrum, Velocity, Visual.

For abstract, see S 04 21.

N66-35782 **Field 20F**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
DEPENDENCE OF THE OPTICAL CONTINUOUS SPECTRUM OF QUASARS ON THEIR REDSHIFT.
Zavisimost' Opticheskogo Nepreryvnogo Spektra Kvazarov Ot Ikh Krasnogo Smeshcheniya
by N. S. Kardashev, and B. V. Komberg. 14 Apr 66, 10p NASA-CR-77681, ST-QSS-PHM-10475
Contract NAS5-9299
Transl. Into English From Astron. Tsirkuliar Akad. Nauk Sssr (Kazan), No. 357, 25 Feb. 1966

Descriptors: *Optical spectrum, *Photometry, *Quasi-stellar radio source (qso), *Red shift, Absorption, Continuous, Dependence, Intergalactic medium, Optical, Quasi-stellar, Radio, Red, Shift, Source, Spectrum.

For abstract, see S 04 21.

N66-35805 **Field 20F**
CFSTI Prices HC$4.00 MF$0.75
Bendix Corp., Davenport, Iowa. Pioneer-central Div.
DEVELOPMENT OF OPTICAL LIQUID LEVEL SENSOR FOR USE IN LIQUID HYDROGEN FINAL REPORT, JUN. 1964 - OCT. 1965.
by W. Dray, N. Hosford, P. Lenker, R. Resh, and R. C. Shearer. 8 Jun 66, 108p NASA-CR-77516
Contract NAS8-11644
Its Publ.-3464-1-66

Descriptors: *Liquid level, *Optical sensor, *Solid state device, Circuit, Design, Device, Hydrogen, Level, Liquid, Operation, Optical, Package, Sensor, Solid, State, Testing.

For abstract, see S 04 21.

N66-35950 **Field 20F**
CFSTI Prices HC$3.75 MF$1.50
Perkin-elmer Corp., Norwalk, Conn. Electro-optical Div.
TWO-GAS ATMOSPHERE SENSOR SYSTEM CONCEPTUAL DESIGN STUDY FINAL REPORT, PHASE I.
16 Mar 66, 261p NASA-CR-66175
Contract NAS1-5678
Its Eng. Rept.-8287

Descriptors: *Mass spectrometer, *Partial pressure, *Space cabin atmosphere, *Spacecraft sensor, Atmosphere, Cabin, Carbon dioxide, Gas, Mass, Nitrogen, Partial, Pressure, Sensor, Space, Spacecraft, Spectrometer, Two, Water.

For abstract, see S 04 21.

N66-35951 **Field 20F**
CFSTI Prices HC$4.25 MF$1.75
Sds Scientific Data Systems, Santa Monica, Calif.
DEVELOPMENT OF A TWO-GAS ATMOSPHERE SENSOR SYSTEM (MASS SPECTROMETER) FINAL STUDY REPORT, PHASE I.
31 Mar 66, 318p NASA-CR-66172
Contract NAS1-5679
Its Book I

Descriptors: *Mass spectrometer, *Space cabin atmosphere, *Spacecraft sensor, Atmosphere, Cabin, Carbon dioxide, Gas, Mass, Nitrogen, Oxygen, Sensor, Space, Spacecraft, Spectrometer, System, Two, Water.

For abstract, see S 04 21.

N66-36134 **Field 20F**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
COMPUTATION OF LIGHT AND ELECTRIC PARAMETERS OF GAS DISCHARGE XENON, DIRECT CURRENT LAMPS.
Raschet Svetovykh I Elektricheskikh Parametrov Gazorazryadnykh Ksenonovykh Lamp Postoyan- Nogo Toka
by R. YE.Rovinskiy. Aug 66, 20p NASA-TT-F-10268
Transl. Into English From Svetotekhnika (Moscow), No. 8, 1958 P 5-10

Descriptors: *Arc lamp, *Electric property, *Gas discharge, *Light intensity, *Xenon light, Ampere, Arc, Brightness, Computation, Current, Dependence, Direct, Discharge, Distribution, Electric, Gas, Intensity, Lamp, Light, Power, Pressure, Property, Ultrahigh, Volt, Xenon.

For abstract, see S 04 21.

N66-36170 **Field 20F**
CFSTI Prices HC$4.00 MF$0.75
France. Ministere De L Air, Paris.
CONTRIBUTION TO THE STUDY OF NON LINEAR OPTICS.

Contribution A L'etude Des Non-linearites Optiques
by J. Ducuing. 1966, 106p NT-151
1966 106 P Refs In French

Descriptors: *Energy transfer, *Nonlinearity, *Optical absorption, *Optics, Absorption, Application, Coherence, Crystal, Energy, Frequency, Kinetic, Luminescence, Moment, Product, Propagation, Reflection, Source, Transfer, Wave.

For abstract, see S 04 21.

PB-173 200 **Field 20F, 4B**
CFSTI Prices: HC$3.00 MF$0.75
Michigan Univ., Ann Arbor. High Altitude Engineering Lab.
THEORETICAL INVESTIGATIONS OF CARBON DIOXIDE RADIATIVE TRANSFER.
Final rept.,
by S. Roland Drayson, and Charles Young. Aug 66, 62p 07349-1-F
Contract Cwb-11106
Proj. ORA-07349

Descriptors: (*Atmosphere models, Air mass analysis), (*Carbon dioxide, Absorption spectrum), Spectra (Infrared), Meteorological parameters, Spectrum analyzers, Line spectrum.

Identifiers: Radiative transfer.

Rotational line positions and intensities for the 15-micron carbon dioxide bands have been calculated, taking into account the important carbon dioxide isotopes. This information has been used to calculate transmissivities for both homogeneous and atmospheric paths. In both cases the results were obtained by direct integration with respect to frequency. The homogeneous path calculations were compared with laboratory measurements and conclusions drawn concerning band strengths. The atmospheric path calculations were compared with measurements made by Satellite Infra Red Spectrometer. (Author)

AD-464 480 **See Field 20E**

AD-639 631 **See Field 6Q**

AD-639 634 **See Field 6Q**

AD-639 862 **See Field 5E**

AD-639 863 **See Field 5E**

AD-639 865 **See Field 5E**

AD-639 885 **See Field 20B**

AD-640 087 **See Field 5E**

AD-640 090 **See Field 5E**

AD-640 092 **See Field 5E**

AD-640 143 **See Field 20E**

AD-640 299 **See Field 20C**

AD-640 497 **See Field 22A**

20G. PARTICLE ACCELERATORS

AD-639 919 **Field 20G, 20H, 6O**
CFSTI Prices: HC$3.00 MF$0.75
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
COMPUTATION OF NUCLIDE YIELD IN A 60-INCH CYCLOTRON.
Technical memo.,
by W. Liben. Jul 66, 73p TG-837
Contract NOw-62-0604

Descriptors: (*Cyclotrons, Particle beams), (*Radioactive isotopes, Production), Particle accelerator targets, Excitation, Equations, Boron, Deuteron bombardment, Neutron reactions, Carbon, Nuclear cross sections, Drugs.

Two procedures are described for computing the yield of isotopes in a 60 in. cyclotron. Both are based on the basic yield equation sigma (E)N sub p (N sub T), where sigma is the excitation function, N sub p the number of bombarding particles, and N sub T the number of target atoms. The excitation function is only available from laboratory measurements. N sub p is proportional to the cyclotron beam current and is constant with time and position in the target, but the particle energy decreases as it penetrates into the target. The yield depends upon N sub p (N) (sigma)dx where N is the number of target atoms per cubic centimeter and dx is a thin slice of the target. A rough approximation to the yield is possible if sigma is taken to be constant, the yield is then given by N sub p (N) (sigma) (Range). The stopping power dE/dx is discussed in detail, including methods for computing the function. Detailed computations are given for the B10 (dn) C11 reaction using rough and more exact procedures. In the Appendix are collected the yield curves for a few short-lived isotopes useful in making radiopharmaceuticals. (Author)

ANL-7171 **Field 20G**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
ARGONNE CYCLOTRON 3 HE CONVERSION,
by W. J. Ramler, R. Benaroya, and G. W. Parker. Feb 66, 29p
Contract W-31-109-eng-38

Descriptors: (*Cyclotrons, Design).

For abstract, see N 20 19.

N66-27962 **Field 20G**
CFSTI Prices HC$1.00 MF$0.50
Avco Corp., Tulsa, Okla.
EVALUATION OF THERMAL CONTROL COATINGS IN THE SPACE ENVIRONMENT INTERIM REPORT.
by J. A. Cooley. 1 Nov 65, 18p NASA-CR-75505, TR-65-359-6/A/
Contract NASW-1162

Descriptors: *Environment simulation, *Solar simulator, *Space environment, *Test facility, Calibration, Coating, Control, Environment, Equipment, Facility, Holder, Monitor, Sample, Scanning, Simulator, Solar, Space, Testing, Thermal, Ultrahigh, Ultraviolet, Vacuum, Van de graaff accelerator.

For abstract, see S 04 15.

N66-28666 **Field 20G, 4A**
CFSTI Prices HC$6.00 MF$1.50
General Dynamics/astronautics, San Diego, Calif. General Atomic Div.
THEORETICAL STUDIES OF SPACE PLASMAS SUMMARY REPORT, 3 MAY 1965 - 1 MAY 1966.
by D. B. Chang, N. A. Krall, L. D. Pearlstein, and M. N. Rosenbluth. 1966, 274p NASA-CR-75542, GA-7119
Contract NASW-1211

Descriptors: *Auroral bombardment, *Ionospheric current, *Plasma instability, *Synchrotron radiation, Aurora, Bombardment, Current, Cyclotron, Dipole, Drift, Field, Flute, Instability, Ionospheric, Magnetosphere, Plasma, Plasmon, Radiation, Resistivity, Space, Synchrotron.

For abstract, see S 04 16.

PB-170 922 **Field 20G, 20H**
CFSTI Prices: HC$5.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ETUDE DU RAYONNEMENT AUTOUR D'UN ACCELERATEUR DE HAUTE ENERGIE. PRODUCTION ET DIFFUSION DES NEUTRONS DE CASCADE. (Study of the Radiation Around a High Energy Accelerator. Production and Scattering of Cascade Neutrons).
Doctoral thesis in French,
by Philippe Tardy-Joubert. 1966, 56p CEA-R-2975
Text in French; attached summary in English.

Descriptors: (*Particle accelerators, *Shielding), (*Proton beams, Secondary emission), (*Neutrons, *Secondary emission), Proton accelerators, Neutron detectors, Cosmic rays, Neutron spectrum, Dosage, Neutron flux, Neutron scattering, France.

The cascade induced in protective screens by a 3GeV proton beam was studied using activation detectors; the results were compared with the cosmic neutron spectrum in the atmosphere. A study of the secondary neutron spectrum made it possible to obtain the distribution of the dose and to determine the maximum permissible fluxes expressed in terms of the energy, taking into account all the daughter products present. The dose calculated was checked experimentally. The propagation of cascade neutrons was studied using the idea of an imaginary source. The parameters which have to be introduced into the general equations to take into account scattering in the air were determined. (Author)

PB-170 923 **Field 20G**
CFSTI Prices: HC$9.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ETUDE DE LA MODULATION DE FREQUENCE DE DIVERS SIGNAUX U.H.F. EXISTANT DANS UN ACCELERATEUR LINEAIRE D'ELECTRONS (Study of the Frequency Modulation of Various U.H.F. Signals Occurring in a Linear Electron Accelerator),
by Roland Bergere, Andre Veyssiere, and Pierre Daujat.Jun 66, 97p CEA-R-2976
Text in French; Attached Summary in English.

Descriptors: (*Electron accelerators, Frequency modulation), Ultrahigh frequency, Propagation, Electron beams, France.

The paper contains a digest of a series of studies on the frequency modulation of U.H.F. fields and signals associated with the linear electron accelerator at Saclay. First considered is the frequency modulation of a U.H.F. pulse before its injection into an accelerating structure and after its subsequent propagation when no accelerated electrons are present. A similar analysis is applied to the frequency modulation due to the direct interaction of the electron beam itself and the accelerating U.H.F. fields. Finally considered is the phase modulation of the elementary electron packet itself. This phase modulation can be correctly interpreted by considering the dynamics of the electron beam as such. This analysis moreover, gives a correct interpretation of the evolution of the phase modulation with time, as the elementary electron packets move along with the sinusoidal U.H.F. accelerating fields. (Author)

PB-170 933 **Field 20G**
CFSTI Prices: HC$1.60 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ETUDE MULTIPARAMETRIQUE DE GAMMA DE CAPTURE (Multi-Parameter Study of Capture Gammas),
by Roland Samama, Herve Nifenecker, Pierre Carlos, and Bernard Delaitre. Jun 66, 20p CEA-R-3034
Text in French; Summary in English.

Descriptors: (*Neutron capture gamma rays, Analysis), Gamma counters, Recording systems, Thermal neutrons, Gamma-neutron reactions, France.

Equipment is described which is intended for analysing, recording and reading simultaneous infor-

mation from several gamma detectors. It allows multiparameter study of gamma-gamma cascades emitted after thermal neutron capture. (Author)

UCRL-16554 **Field 20G, 20H**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.
BEVATRON OPERATION AND DEVELOPMENT. 47. JULY-SEPTEMBER 1965,
by Kenneth C. Crebbin, and Robert Frias. 22 Mar 66, 19p
Contract W-7405-eng-48

Descriptors: (*Bevatrons, Operation).

For abstract, see N 20 19.

UCRL-16741 **Field 20G, 20H**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.
BEVATRON OPERATION AND DEVELOPMENT. 48. OCTOBER-DECEMBER 1965,
by Kenneth C. Crebbin. 5 May 66, 17p
Contract W-7405-eng-48

Descriptors: (*Bevatrons, Operation).

For abstract, see N 20 19.

AD-639 962 **See Field 14B**

20H. PARTICLE PHYSICS

AD-639 658 **Field 20H**
CFSTI Prices: HC$3.00 MF$0.50
Naval Research Lab., Washington, D. C.
NEUTRON PRODUCTION BY FUSION IN A CLASS OF ANISOTROPIC PLASMAS.
Final rept.,
by J. B. Langworthy. 30 Jun 66, 51p NRL-6391
Grant NSF-GP-3217
Projs. HO2-24, RR-002-10-45-5054
Submitted to the faculty of the Graduate School of the University of Maryland.

Descriptors: (*Thermonuclear reactions, *Plasma physics), (*Neutrons, Production), Anisotropy, Deuterium, Numerical analysis.

The neutron production rate of a fusion reaction in a plasma of deuterium is calculated by a non-Maxwellian average, assuming the differential cross section is known. For the average it is assumed the ion velocity distribution of one plasma component is that of a beam and that of the other component is a Maxwell distribution. It is found that cross section anisotropy has no effect on neutron production rate or on the excitation function. An expression is obtained which contains the detailed effects of anisotropy on neutron speed and angle distributions. Prominent behavior of this expression is discussed. For purposes of numerical calculation, a Gamow form is assumed for the total cross section. Neutron production rate results are presented in a contour plot as a function of beam energy and plasma temperature over ranges of the parameters of most interest in thermonuclear research. Prominent behavior here is understood in the light of two well known subcases of this calculation: (1) neutron production by bombarding a cold target and (2) neutron production from a Maxwellian plasma. A qualitative analysis with order of magnitude estimates is made to consider the practical implications of the use of the assumed nonequilibrium distribution. It is shown that the assumed distribution may exist for small observation volumes and for short observation times in plasma regimes of thermonuclear interest. It is a general result of this analysis that an arbitrary plasma cannot be shown isotropic except by fine time resolution technique. (Author)

AD-639 664 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Syracuse Univ., N. Y. Dept. of Physics.
MESON AND BARYON SPECTROSCOPY; NEUTRAL CURRENTS IN THE WEAK INTERACTION.
Progress rept.,
by Jack Leitner. 30 Jun 66, 5p
Contract Nonr-669 (12)
Proj. NR-022-296

Descriptors: (*Elementary particles, Quantum mechanics), (*Mesons, Quantum mechanics), (*Baryons, Quantum mechanics), K mesons, Nuclear reactions, Decay schemes, Hyperons, Xi hyperons.

Identifiers: Omega mesons, Y particles, Weak interactions.

Progress in experimental studies involving the following topics is briefly summarized: properties of the f*, properties of the K**, measurement of the neutral-K1 - neutral K2 mass difference via the strangeness oscillation technique, branching ratios of the Y1* (1660) hyperon, estimate of the negative-omega branching ratios, study of negative-Xi final states.

AD-639 800 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
High Energy Physics Lab., Stanford Univ., Calif.
EXCITATION OF A 19-MeV LEVEL IN C12 BY INELASTIC ELECTRON SCATTERING,
by Hall Crannell, Harvey A. Dahl, and F. H. Lewis Jr. Mar 66, 15p HEPL-432, ITP-206
Contracts Nonr-225 (67), AF 49 (638)-1389
Prepared in cooperation with Institute of Theoretical Physics, Stanford Univ., Calif.

Descriptors: (*Carbon, *Nuclear energy levels), (*Electron bombardment, Carbon), Inelastic scattering, Electron transitions, Momentum, Dipole moments, Excitation.

Measurements of inelastic electron scattering cross sections for Carbon-12 were made for transitions to a level at approximately 19.5 MeV. The cross section peak corresponding to excitation of this level is clearly visible above the inelastic continuum over the range of momentum transfers from 267 MeV/c to 643 MeV/c at electron scattering angles between 40 degrees and 48 degrees. Form factors derived from the experimental data are compared to theoretical form factors calculated by assuming the excitation involves a single-particle dipole transition to a T = 1, J = 1 (-) state. A search for levels with higher excitation energies was also undertaken, special attention being focused on the region 30 MeV to 45 MeV. This failed to uncover, within the experimental sensitivity, any levels with excitation energy greater than 20 MeV. (Author)

AD-639 814 **Field 20H**
Not available from CFSTI.
Imperial Coll. of Science and Technology, London (England). Dept. of Physics.
ANALYSIS OF PROTON, ANTI-PROTON PRODUCING PION, KAON, ANTI-KAON AT REST,
by M. S. K. Razmi, and R. G. Roberts. 4 Jan 66, 10p
Grant AF-EOAR-46-64
Proj. AF-9751
Task 975101
AFOSR-66-1878
Availability: Published in Il Nuovo Cimento ser10 v44 p177-84 Jul 1 1966.

Descriptors: (*Annihilation reactions, *Proton reactions), (*K mesons, Annihilation reactions), (*Antiparticles, Annihilation reactions), Meson reactions, Pions, Momentum, Groups (Mathematics), Decay schemes, Great Britain.

Identifiers: Symmetry (Quantum mechanics).

A method is developed for analysing the Dalitz plot density for the pi, kaon, anti-kaon final state assuming intermediate production of K* and A2. The angular-momentum and SU3 analysis takes into account the interference between the K*'s and between each K* and the A2. Computation of the expressions shows that the enhancement seen for low K, anti-K mass cannot be explained by angular-momentum effects. (Author)

AD-639 821 **Field 20H, 20J**
Not available from CFSTI.
Imperial Coll. of Science and Technology, London (England). Dept. of Physics.
U (12) ABSORPTION MODEL FOR PROTON-ANTIPROTON GIVING LAMBDA AND ANTI-LAMBDA,
by H. D. D. Watson, and J. H. R. Migneron. 17 Oct 65, 5p
Grant AF-EOAR-46-64
Proj. AF-9751
Task 975101
AFOSR-66-1545
Availability: Published in Physics Letters v19 n5 p524-6 Nov 15 1965.

Descriptors: (*Proton reactions, Mathematical models), (*Antiparticles, Groups (Mathematics)), (*V particles, Groups (Mathematics)), Annihilation reactions, Vector analysis, Field theory, Elastic scattering, Momentum, Great Britain.

Identifiers: Symmetry (Quantum mechanics), Unitarity.

Brief details are presented of a calculation of the reaction 'proton + antiproton yields lambda + anti-lambda' at 3.7 GeV/c, in which the U (12) symmetry scheme is used to write down peripheral amplitudes on which the requirements of unitarity are then approximately enforced by the inclusion of absorptive effects in the initial and final states.

AD-639 861 **Field 20H**
Not available from CFSTI.
Oslo Univ. (Norway). Inst. of Physics.
STUDY OF THE LAMBDA-p EFFECTIVE MASS SPECTRUM AND THE LAMBDA LIFETIME,
by T. Buran, O. Eivindson, O. Skjeggestad, H. Toefte, and I. Vegge. 19 Jan 66, 5p
Grant AF-EOAR-95-65
Proj. AF-9751
Task 975101
AFOSR-66-0823
Availability: Published in Physics Letters v20 n3 p318-20 Feb 15 1966.

Descriptors: (*Meson capture, Decay schemes), (*V particles, Nuclear spectroscopy), Halogenated hydrocarbons, Meson bombardment, K mesons, Protons, Norway.

Results are reported from a systematic search for the production of lambda-p resonant states in multinucleon negative-K captures on complex nuclei. (Author)

AD-639 969 **Field 20H**
Not available from CFSTI.
Institute of Theoretical Physics, Stanford Univ., Calif.
MUONIC MOLECULES AND NUCLEON-DEUTERON CAPTURE.,
by B. P. Carter. 13 Sep 65, 12p
Contract AF 49 (638)-1389, Grant NSF-GP-948
Proj. AF-9751
Task 975101
AFOSR-66-1326
Availability: Published in The Physical Review v141 n3 p863-72 Jan 1966.

Descriptors: (*Muons, Molecules), (*Wave functions, Muons), (*Nuclear cross sections, Muons), Nuclear energy levels, Ground state, Nucleons, Protons, Deuterons, Deuterium, Proton bombardment, Gamma emission, Helium.

Identifiers: Muonic molecules.

Variational wave functions were computed for all S states of muonic molecules involving hydrogen isotopes. Results for the p-mu-d ground state were used to compare nucleon-deuteron capture cross sections with p-mu-d fusion rates. Using the molecular wave functions and the results of muonic molecule experiment, the low energy S wave cross-section is estimated for the reaction D (p,gamma)He3. The result is in disagreement with measurements in the tens-of-kilovolts region, but is consistent with thermal neutron-deuteron capture data when Coulomb effects are taken into account by means of the usual penetration factor. Finally, the usual assumption that proton-deuteron capture occurs only from the doublet state is reexamined, and it is shown how the doublet and quartet matrix elements could both be determined from a new measurement of the total yield of gamma rays from p-mu-d fusion in liquid hydrogen. (Author)

AD-639 970 **Field 20H**
Not available from CFSTI.
Institute of Theoretical Physics, Stanford Univ., Calif.
ELECTRON SCATTERING FROM AN ALIGNED DEFORMED NUCLEUS,
by H. B. Greenstein. 7 Dec 65, 18p
Contract AF 49 (638)-1389
Proj. AF-9751
Task 975101
AFOSR-66-1328
Availability: Published in The Physical Review v144 n3 p902-17 Apr 22 1966.

Descriptors: (*Nuclei, Electron bombardment), (*Electrons, *Potential scattering), (*Holmium, *Nuclear structure), Magnetic fields, Integrals, Deformation, Quadrupole moments, Nuclear spins, Approximation (Mathematics).

The problem of scattering high energy electrons from a deformed nucleus which has been aligned in a magnetic field is considered from the point of view of the Schiff approximation for high energy potential scattering. Integrals for the scattering amplitude are evaluated in the asymptotic limit of large Beta (Beta is identical with QR) assuming a model for the charge density distribution which is equivalent to a uniformly charged ellipsoid of revolution. It is found that terms bilinear in the quadrupole strength must be retained. The formalism is extended to take account of nuclear spin state transitions. Low lying rotational levels are summed over using the Bohr-Mottelson model in the strong coupling limit. Application is made to the case of the holmium nucleus. (Author)

AD-639 971 **Field 20H**
Not available from CFSTI.
Institute of Theoretical Physics, Stanford Univ., Calif.
RELATIVISTIC CORRECTIONS TO THE IMPULSE APPROXIMATION IN ELASTIC ELECTRON-DEUTERON SCATTERING,
by Franz Gross. 15 Sep 65, 12p
Contract AF 49 (638)-1389
Proj. AF-9751
Task 975101
AFOSR-66-1310
Availability: Published in The Physical Review v142 n4 p1025-34 Feb 25 1966.

Descriptors: (*Deuterons, *Nuclear scattering), (*Electrons, *Elastic scattering), Wave functions, Approximation (Mathematics), Relativity theory, Perturbation theory, Magnetic moments.

Identifiers: Form factors.

Equations are derived for the deuteron form factor in the impulse approximation which include corrections to order 1/M sq where M is the nucleon mass. The corrections are of two types, arising from (1) the expansion of the nucleon current to order 1/M sq and (2) the treatment of the deuteron wave function in a relativistic manner so as to retain terms of order 1/M sq which describe the distortion of the wave function of a moving deuteron. While some of the former corrections have been discussed by several people, detailed results for the latter corrections have not been given before. All of the results are expressed as functionals of the non-relativistic S and D state wave functions, so that numerical results may be calculated for any deuteron model. Numerical estimates of the charge correction term indicate that it is large enough to substantially affect the determination of the neutron charge form factor from this experiment, making the form factor more positive than results obtained from the uncorrected theory. Corrections to the magnetic moment are also discussed. (Author)

AD-639 974 **Field 20H**
Not available from CFSTI.
Institute of Theoretical Physics, Stanford Univ., Calif.
DIFFERENTIAL CROSS SECTION FOR 'POSITRON + ELECTRON YIELDS POSITIVE-W + NEGATIVE-W YIELDS ANTI-E-NEUTRINO + POSITIVE-MUON + MU-NEUTRINO',
by Y. S. Tsai, and A. C. Hearn. 24 Jun 65, 11p
Contract AF 49 (638)-1389, Grant NSF-GP-948
Proj. AF-9751
Task 975101
AFOSR-66-0811
Availability: Published in The Physical Review v140 n3B pB721-9 Nov 8 1965.

Descriptors: (*Annihilation reactions, *Nuclear cross sections), (*Bosons, Pair production), Positrons, Electrons, Decay schemes, Antiparticles, Neutrinos, Muons, Electron beams, Field theory, Vector analysis.

The cross section for electron pair annihilation into an intermediate heavy boson pair and then into negative electron, positive muon, electron neutrino, and muon neutrino, is calculated for electron-muon coincidence detection with colliding beams. Properties of the W boson are treated as parameters. The analytic expression for the cross section was obtained by an electronic computer, and then evaluated numerically. Only one-photon exchange was considered. Symmetries in the differential cross section are discussed. The charge conjugate mode leading to positron and negative muon is readily obtained from these results. It is pointed out that the techniques used in this paper can be employed to calculate many other processes in which two unstable particles are produced. (Author)

AD-639 977 **Field 20H**
Not available from CFSTI.
Harvard Univ., Cambridge, Mass. Dept. of Physics.
HIGH-ENERGY DEUTERON CROSS SECTIONS,
by R. J. Glauber, and V. Franco. 9 Aug 65, 22p
Contracts AF 49 (638)-1380, AT (30-1)-2098
Proj. AF-9751
Task 975101
AFOSR-66-0810
Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge.
Availability: Published in The Physical Review v142 n4 p1195-214 Feb 25 1966.

Descriptors: (*Deuteron cross sections, Analysis), Elastic scattering, Inelastic scattering, Nuclear spins, Neutrons, Protons, Antiparticles, Wave functions.

A theoretical analysis of the collisions of particles with deuterons is carried out in the high-energy approximation. This approximation, which corresponds to a generalized form of diffraction theory, takes explicit account of double collision processes as well as single ones. It is used to express the amplitudes for elastic and inelastic scattering by deuterons in terms of the elastic-scattering amplitudes of the neutron and proton and the deuteron wave functions. The resulting expressions are used to evaluate the differential cross section for elastic scattering, and the angular distribution of inelastic scattering (i.e., the differential cross section for deuteron breakup integrated over final energies of the incident particle). Expressions are derived for the total cross section of the deuteron and for its elastic and inelastic total scattering and absorption cross sections. The difference between the various types of deuteron cross sections and the sum of the corresponding cross sections for the free neutron and proton is explained in some detail. Spin-dependent interactions are treated, and for incident particles of spin 1/2 an expression is given for the deuteron total cross section in terms of the general spin-dependent scattering amplitudes of the neutron and proton. The theory is applied to antiproton-deuteron collisions in the energy range from 0.13 to 17.1 BeV.

AD-639 983 **Field 20H**
Not available from CFSTI.
Palmer Physical Lab., Princeton Univ., N. J.
NOTE ON POSITRONIUM,
by George Tiktopoulos. 19 Oct 64, 6p
Contract AF 49 (638)-1333
AFOSR-66-0825
Availability: Published in Journal of Mathematical Physics v6 n4 p573-7 Apr 1965.

Descriptors: (*Positronium, Field theory), Operators (Mathematics), Integrals, Nuclear energy levels, Electrons, Positrons, Wave functions.

Identifiers: Bethe-Salpeter equation.

By means of an inequality providing an upper bound for the norm of integral operators, it is shown that the Bethe-Salpeter equation for bound states of the electron-positron system (in the ladder approximation) admits solutions associated with a discrete spectrum of binding energies. It is found that in the weak coupling limit the spectrum approaches asymptotically the Coulomb spectrum. (Author)

AD-640 270 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Naval Research Lab., Washington, D. C.
BIBLIOGRAPHY OF TRITON INDUCED REACTIONS,
by David Owen. Aug 65, 35p NRL-Bib-28

Descriptors: (*Tritons, *Nuclear reactions), Bibliographies, Abstracts, Indexes, Triton bombardment.

The bibliography contains summaries of the articles published on triton induced reaction between 1961 and 1965. Also included is both an author and a subject index to increase the utility of the bibliography. (Author)

AD-640 399 **Field 20H, 18B**
CFSTI Prices: HC$1.00 MF$0.50
Carnegie Inst. of Tech., Pittsburgh, Pa. Dept. of Physics.
HARTREE-FOCK CALCULATIONS WITH A DENSITY-DEPENDENT INTERACTION.
Technical rept.,
by S. J. Krieger, M. Baranger, and K. T. R. Davies. Aug 66, 14p TR-25
Contract Nonr-760 (15)
Proj. NR-024-439
Prepared in cooperation with Oak Ridge National Lab., Tenn.

Descriptors: (*Nuclear properties, *Hartree-Fock approximation), Nuclei, Nucleons, Nuclear forces, Density, Nuclear energy levels, Carbon, Oxygen, Silicon, Calcium.

A simple, density-dependent, effective two-nucleon interaction is used in the calculation of finite nuclei by the Hartree-Fock approximation. Results are obtained for the binding energy, density, and single-particle levels of carbon-12, oxygen-16, Silicon-28, and calcium-40. (Author)

AD-640 464 Field 20H
CFSTI Prices: HC$6.00 MF$1.25
United Nuclear Corp., Elmsford, N. Y. Research and Engineering Center.
NEUTRON CROSS SECTIONS OF NIOGEN, OXYGEN, ALUMINUM, SILICON, IRON, DEUTERIUM, AND BERYLLIUM,
by J. H. Ray, G. Grochowski, and E. S. Troubetzkoy. 15 Nov 65, 181p UNC-5139
Contract DA-18-035-AMC-125 (A)
Proj. UNC-2322

Descriptors: (*Neutron cross sections, Tables), (*Nitrogen, Neutron cross sections), (*Oxygen, Neutron cross sections), (*Aluminum, Neutron cross sections), (*Silicon, Neutron cross sections), (*Iron, Neutron cross sections), (*Deuterium, Neutron cross sections), (*Beryllium, Neutron cross sections), Elastic scattering, Neutron reactions, Gamma emission, Neutron spectrum, Nuclear energy levels.

Neutron cross-section sets were prepared for N, O, Al, Si, Fe, D, and Be for neutron energies from 0.037 eV to 18 MeV. The cross sections tabulated include the total, elastic, inelastic, (n,2n), and cross sections for charged particle emission. Information is also given on the angular distribution of elastically scattered neutrons and on the energy distribution of neutrons and gamma-rays following nonelastic reactions. (Author)

BNL-945 Field 20H
CFSTI Prices: HC$10.10 MF$3.00
Brookhaven National Lab., Upton, N. Y.
SOME MORE TWO-BODY KINEMATICS TABLES,
by L. B. Leipuner. Oct 65, 719p
Contract AT-30-2-GEN-16

Descriptors: (*Nuclear reactions, *Elementary particles).

For abstract, see N 20 19.

LA-3553 Field 20H, 20I
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., N. Mex.
PROPOSED STRAIGHT THETA-PINCH DEVICES ENERGIZED BY THE ENERGY STORAGE SUPPLY OF THE TOROIDAL THETA-PINCH (SCYLLAC),
by R. S. Dike, E. L. Kemp, and W. E. Quinn. Apr 66, 29p
Contract W-7405-eng-36

Descriptors: (*Magnetic pinch, *Thermonuclear reactions).

For abstract, see N 20 20.

N66-27028 Field 20H
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LOW ENERGY ELECTRONS IN THE DARK MAGNETOSPHERE.
by P. Serlemitsos. Aug 65, 34p NASA-TM-X-56886
Submitted For Publication

Descriptors: *Electron, *Explorer xiv satellite, *Geomagnetic field, *Magnetosphere, Activity, Anisotropy, Field, Flux, Geomagnetic, Low energy, Measurement, Pulse, Satellite, Trap.

For abstract, see S 04 15.

N66-27032 Field 20H
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE LOW ENERGY SPECTRUM OF COSMIC RAYS AS AN INDICATOR OF PRIMARY SOURCE CHARACTERISTICS AND INTERSTELLAR PROPAGATION.
by V. K. Balasvbrahmanyan, E. Boldt, and R. A. Palmeira, 21 Jun 65, 25p NASA-TM-X-55231, X-611-65-249
Submitted For Publication

Descriptors: *Cosmic radiation, *Energy spectrum, *Interstellar radiation, Characteristics, Cosmic, Diffusion, Energy, Function, Helium, Interstellar, Low energy, Modulation, Nucleus, Particle, Proton, Radiation, Solar, Source, Spectrum, Star, Transmission.

For abstract, see S 04 15.

N66-27066 Field 20H
CFSTI Prices HC$3.00 MF$0.75
California Inst. Of Tech., Pasadena.
NEUTRON STARS II. NEUTRINO-COOLING AND OBSERVABILITY.
by J. N. Bahcall, and R. A. Wolf. 1965, 61p NASA-CR-67875
Contracts NGR-05-002-028, NONR-220/47/
Submitted For Publication

Descriptors: *Cooling, *Neutrino, *Neutron star, Calculation, Electron, Elementary, Heuristic, Lepton, Neutron, Nucleon-nucleon, Particle, Rate, Scattering, Source, Star, X-ray.

For abstract, see S 04 15.

N66-27067 Field 20H
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
A NUMERICAL SIMPLIFICATION AND ALTERNATIVE TO THE RKR METHOD FOR DIATOMIC MOLECULES.
by W. E. Meador. 1965, 17p NASA-TM-X-56898
Submitted For Publication

Descriptors: *Diatomic molecule, *Energy level, *Klein-dunham potential, *Potential energy, Diatomic, Energy, Hydrogen, Integration, Level, Molecular, Molecule, Morse potential, Numerical, Potential, Simplification.

For abstract, see S 04 15.

N66-27078 Field 20H
CFSTI Prices HC$3.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LOW ENERGY ELECTRONS MEASURED ON IMP II.
by E. J. Maier, and G. P. Serbu. Jan 66, 60p NASA-TM-X-55464, X-615-66-92
Submitted For Publication

Descriptors: *Electron distribution, *Imp, *Spectrum, Boundary, Cube, Density, Electron, Interplanetary, Inverse, Low energy, Magnetic, Maxwell distribution, Monitor, Number, Platform, Sheath, Shock, Temperature.

For abstract, see S 04 15.

N66-27180 Field 20H
CFSTI Prices HC$2.00 MF$0.50
Ltv Aerospace Corp., Dallas, Tex. Ltv Astronautics Div.
ANALYSIS OF POLAR CAP ABSORPTION EVENTS. II - TIME RELATION OF MAJOR FLARES AND RF EMISSIONS AT CENTIMETER WAVELENGTHS FIRST QUARTERLY REPORT.
by F. C. Jonah. 6 May 66, 43p NASA-CR-65370
Contract NAS9-4911
Its Rept.-00.802

Descriptors: *Polar cap absorption, *Radio frequency, *Solar flare, Absorption, Cap, Centimeter, Classification, Emission, Flare, Frequency, Magnetic, Polar, Radio, Relation, Solar, Sunspot, Table, Time, Wavelength.

For abstract, see S 04 15.

N66-27189 Field 20H
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration, Washington, D. C.
THE MAGNETIC FIELD STRUCTURE AND ITS VARIATIONS IN THE SOLAR FLARE REGION.
Struktura Magnitnykh Poley I Yeye Izmeneniya V Rayone Solnechnykh Vspyshek
by S. I. Gopasyuk, M. B. Ogiri, A. B. Severnyy, and YE. F.Shaposhhnikova. Apr 64, 83p NASA-TT-F-8724
Transl. Into English From Izv. Krymsk. Astrofiz. Observ. (Moscow), V. 29, 1963 P 15-67

Descriptors: *Magnetic field, *Solar flare, Configuration, Cosmic, Field, Flare, Gradient, Magnetic, Proton, Ray, Solar, Structure, Variation.

For abstract, see S 04 15.

N66-27199 Field 20H
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
ON THE RADIO AND X-RAY EMISSION OF SOLAR FLARES.
O Radioizluchenii I Rentgenovskom Izluchenii Solnechnykh Vspyshek
by A. K. Pankratov. Apr 64, 23p NASA-TT-F-8723
Transl. Into English From Izv. Krymsk. Astrofiz. Observ. (Moscow), V. 29, 1963 P 160-174

Descriptors: *Radio emission, *Solar flare, *X-ray analysis, Analysis, D layer, Emission, Flare, Igy, Ionization, Ionosphere, Radio, Solar, X-ray.

For abstract, see S 04 15.

N66-27200 Field 20H
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
ON ELECTRONICS WITH ENERGIES GREATER THAN 1600 KE V IN THE EARTH'S RADIATION BELTS.
Elektrony S Energiyey Boleye 1600 Kev V Radiatsionnykh Zonakh Zemli
by A. I. Yershkovich. Feb 64, 9p NASA-TT-F-8578
Transl. Into English From Izv. Akad. Nauk Sssr, Ser. Geofiz. (Moscow), No. 9, 1963 P 1457-1461

Descriptors: *Angular distribution, *Electron energy, *Energy distribution, *Fast neutron, *Neutron decay, *Radiation belt, Angular, Belt, Decay, Distribution, Electron, Energy, Flux, Kinetic, Neutron, Radiation.

For abstract, see S 04 15.

N66-27208 Field 20H
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
INVESTIGATION OF THE X-RAY EMISSION OF SOLAR FLARES BY THE RADIOASTRONOMICAL METHOD.
Issledovaniye Rentgenovskogo Izlucheniya Solnechnykh Vspyshek Radioastronomicheskim Metodom
by YU. I.Neshpor. 25 Nov 65, 13p NASA-TT-F-8644, ST-SP-10073
Contract NAS5-2078
Transl. Into English From Izv. Krymsk. Astrofiz. Observ. (Moscow), V. 29, 1963 P 152-159

Descriptors: *Radio astronomy, *Solar flare, *X-ray, Absorption, Astronomy, Emission, Flare, Frequency, Intensity, Ionospheric, Measurement, Radiation, Radio, Solar, Spectrum.

For abstract, see S 04 15.

N66-27209 Field 20H
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
OBSERVATIONS OF THE SOLAR WIND DURING THE FLIGHT OF IMP-I.
by M. A. Myers, R. W. Silva, and J. H. Wolfe. 1965, 66p NASA-TM-X-56605
Submitted For Publication

Descriptors: *Explorer xviii satellite, *Solar wind, Analyzer, Electrostatic, Energy, Explorer project, Field, Flight, Flow, Geomagnetic, Measurement, Observation, Plasma, Satellite, Turbulence.

For abstract, see S 04 15.

N66-27214 Field 20H
CFSTI Prices HC$1.00 MF$0.50
Chicago Univ., Ill. Enrici Fermi Inst. For Nuclear Studies.
OBSERVATION OF THE COSMIC RAY ELECTRON- POSITRON RATIO FROM 100 ME V TO 3 BE V IN 1964.
by R. C. Hartman, R. H. Hildebrand, and P. Meyer. Feb 65, 8p NASA-CR-57342, EFINS-65-13
Grant NSG-144-61
Submitted For Publication

Descriptors: *Balloon flight, *Cosmic ray, *Electron, *Positron, Balloon, Camera, Cerenkov counter, Coincidence, Cosmic, Counter, Failure, Flight, Ray, Telescope.

For abstract, see S 04 15.

N66-27219 Field 20H
CFSTI Prices HC$1.00 MF$0.50
Chicago Univ., Ill. Enrico Fermi Inst. For Nuclear Studies.
SOLAR MODULATION OF THE GALACTIC HELIUM SPECTRUM ABOVE 30 ME V PER NUCLEON.
by C. Y. Fan, G. Gloeckler, and J. A. Simpson. 1965, 16p NASA-CR-67819, EFINS-65-87
Contract NAS5-2900, Grant NSG-179-61
Presented At Intern. Conf. On Cosmic Rays, London, 6-17 Sep. 1965 Submitted For Publication

Descriptors: *Charged particle, *Energy spectrum, *Time measurement, Balloon, Charge, Differential, Energy, Flux, Galaxy, Helium, Kinetic, Measurement, Modulation, Nucleus, Particle, Satellite, Spectrum, Telescope, Time, Velocity.

For abstract, see S 04 15.

N66-27322 Field 20H
CFSTI Prices HC$2.00 MF$0.50
Chicago Univ., Ill. Enrico Fermi Inst. For Nuclear Studies.
STABILITY OF INTERSTELLAR GAS AND FIELD INCLUDING ROTATION.
by I. Lerche. 1966, 42p NASA-CR-75413, EFINS-66-48
Grant NSG-96-60

Descriptors: *Astrophysics, *Hydromagnetism, *Intergalactic medium, *Interstellar gas, Cosmic, Field, Gas, Intergalactic, Interstellar, Medium, Pressure, Ray, Rotation.

For abstract, see S 04 15.

N66-27734 Field 20H
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
MONTE CARLO INTERPRETATION OF SPHERE TRANSMISSION EXPERIMENTS FOR AVERAGE CAPTURE CROSS SECTIONS AT 24 KE V.
by D. Bogart, and T. T. Semler. Jun 66, 27p NASA-TR-R-239
Presented At The Conf. On Neutron Cross Section Technol., Washington, 22-24 Mar. 1966

Descriptors: *Monte carlo method, *Neutron cross section, *Slow neutron, *Spherical shell, Capture, Cross, Experiment, Gold, Iodine, Neutron, Resonance, S-wave, Scattering, Section, Shell, Slow, Spectroscopy, Spherical, Transmission.

For abstract, see S 04 15.

N66-27735 Field 20H
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
BORON CROSS SECTIONS AS A SOURCE OF DISCREPANCY FOR CAPTURE CROSS SECTIONS IN THE KE V REGION.
by D. Bogart, 20 Jun 66, 23p NASA-TR-R-240
Presented At The Conf. On Neutron Cross Section Technol., Washington, 22-24 Mar. 1966

Descriptors: *Boron, *Gold, *Neutron cross section, Antimony, Capture, Cross section, Flux, Indium, Iodine, Monitor, Neutron, Radiative, Silver, Tantalum, Velocity.

For abstract, see S 04 15.

N66-27926 Field 20H
CFSTI Prices HC$2.00 MF$0.50
California Univ., La Jolla. Dept. Of Physics.
THE SPECTRUM OF CRAB NEBULA X-RAYS TO 120 KE V.
by A. S. Jacobson, R. M. Pelling, and L. E. Peterson. 21 Dec 65, 40p NASA-CR-75652, UCSD-SP-65-6
Grant NSG-318
Submitted For Publication

Descriptors: *Balloon sounding, *Crab nebula, *X-ray spectrometry, Background, Balloon, Cosmic, Crystal, Detector, Differential, Energy, Flux, Iodide, Nebula, Photon, Ray, Sodium, Sounding, Spectrometry, Spectrum, X-ray.

For abstract, see S 04 15.

N66-28020 Field 20H
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF MAGNETIC BEACH ON RF POWER ABSORPTION IN ION CYCLOTRON RESONANCE.
by C. C. Swett, 1966, 16p NASA-TM-X-52210
Presented At The Am. Phys. Soc. Meeting, Minneapolis, 20-26 Jun. 1966

Descriptors: *Absorption, *Cyclotron resonance, *Magnetic field disturbance, Beach, Cyclotron, Disturbance, Field, Heat, Ion, Magnetic, Plasma, Resonance, Shielding.

For abstract, see S 04 15.

N66-28025 Field 20H
CFSTI Prices HC$4.00 MF$0.75
Cornell Univ., Ithaca, N. Y. Center For Radiophysics And Space Research.
ADIABATIC INVARIANT TRAPPED RADIATION SHELLS AND COSMIC RAY CUTOFFS IN MODELS OF THE MAGNETOSPHERE DISTORTED BY THE SOLAR WIND PLASMA.
by A. B. Friedland, Mar 66, 119p NASA-CR-75563, CRSR-231
Grant NSG-382

Descriptors: *Cosmic ray, *Magnetosphere, *Solar wind, *Trapped radiation, Adiabat, Cosmic, Model, Plasma, Radiation, Ray, Shell, Solar, Trapping, Wind.

For abstract, see S 04 15.

N66-28085 Field 20H
CFSTI Prices HC$5.00 MF$1.25
Southwest Center For Advanced Studies, Dallas, Tex.
COSMIC RAY TABLES - ASYMPTOTIC DIRECTIONS, VARIATIONAL COEFFICIENTS AND CUT-OFF RIGIDITIES IQSY INSTRUCTION MANUAL NO. 10.
by B. C. Fowler, K. G. Mc cracken, U. R. Rao, M. A. Shea, and D. F. Smart, May 65, 200p NASA-CR-75779
Grant NSG-269-62, Contract NSF GP-926

Descriptors: *Cosmic ray, *Diurnal variation, *Geomagnetic field, *Table, Asymptote, Coefficient, Cosmic, Deflection, Diurnal, Field, Geomagnetic, Intensity, Particle, Radiation, Ray, Trajectory, Variation.

For abstract, see S 04 15.

N66-28104 Field 20H, 18H
CFSTI Prices HC$2.00 MF$0.50
Istituto Superiore Di Sanita, Rome (Italy). Laboratori Di Fisica.
THE LABORATORIES OF PHYSICS AT THE BEGINNING OF 1966.
I Laboratori Di Fisica, All'inizio Del 1966
by M. Ageno, 15 Feb 66, 35p ISS-66/3

Descriptors: *Biophysics, *Electron microscopy, *Molecular structure, *Nuclear physics, *Radiation dose, *Theoretical physics, Dose, Dosimetry, Electron, High energy, Laboratory, Matter, Microscopy, Molecular, Nuclear, Personnel, Physics, Radiation, Structure, Theoretical, Training, X-ray.

For abstract, see S 04 15.

N66-28127 Field 20H
CFSTI Prices HC$3.00 MF$0.50
Istituto Superiore Di Sanita, Rome (Italy). Laboratori Di Fisica.
PAPERS PRESENTED AT THE 51ST NATIONAL CONGRESS OF THE ITALIAN PHYSICAL SOCIETY, BOLOGNA, NOVEMBER 5-10, 1965.
Communicazioni Presentate Dai Laboratori Di Fisica Al 51o Congresso Nazionale, Di Fisica, 5-10 Novembre 1965
by U. Amaldi Jr. 30 Oct 65, 53p ISS-65/40
In Italian, English Summary

Descriptors: *Elementary particle, *Nuclear physics, *Nucleon, *Proton, *Theoretical physics, Angular, Binding, Distribution, Electron, Elementary, Energy, Nuclear, Particle, Physics, Positron, Reaction, Scattering, Theoretical, Unitarity, Wave.

For abstract, see S 04 15.

N66-28177 Field 20H
CFSTI Prices HC$2.00 MF$0.50
Osterreichische Studiengesellschaft Fur Atomenergie G.m.b.h., Seibersdorf (Austria). Reaktorzentrum.
INFLUENCE OF PHOTOELECTRON STATISTICS ON TIME- CORRELATIONS IN FAST COINCIDENCE MEASUREMENTS.
by H. Halling, S. Mayerhofer, H. Nabilek, and E. Ujlaki, 1966, 26p SGAE-PH-38/1966
Submitted For Publication

Descriptors: *Photoelectron, *Statistics, *Time function, Coincidence, Correlation, Emission, Fast, Function, Lifetime, Low energy, Measurement, Scintillator, Time.

For abstract, see S 04 15.

N66-28210 Field 20H
CFSTI Prices HC$2.00 MF$0.50
Istituto Superiore Di Sanita, Rome (Italy). Laboratori Di Fisica.
THE SPECTRAL DISTRIBUTION OF PHOTONS SCATTERED BY ELECTRONS BOUND IN THE K SHELL, III.

Distribuzione Spettrale Di Fotoni Diffusi Da Elettroni Legati Nella Shell K, Iii
by M. A. Di Iazzaro, and G. Missoni. 21 Feb 66, 40p ISS-66/8

Descriptors: *Gamma ray beam, *Gold, *K-shell, *Photon, *Spectral energy distribution, *Uranium, Beam, Bound, Bremsstrahlung, Coulomb potential, Cross section, Differential, Dirac equation, Distribution, Electron, Energy, Gamma, Measurement, Ray, Scattering, Spectral.

For abstract, see S 04 15.

N66-28221 **Field 20H**
CFSTI Prices HC$2.00 MF$0.50
Istituto Superiore Di Sanita, Rome (Italy). Laboratori Di Fisica.
THE SPECTRAL DISTRIBUTION OF PHOTONS SCATTERED BY ELECTRONS BOUND IN THE K SHELL, I.
Distribuzione Spettrale Di Fotoni Diffusi Da Elettroni Legati Nella Shell K, I
by M. A. Di Iazzaro, and G. Missoni. 21 Feb 66, 44p ISS-66/6
For Abstract See N66-28210 15-24

Descriptors: *Gamma ray beam, *Gold, *K-shell, *Photon, *Spectral energy distribution, *Uranium, Beam, Bound, Bremsstrahlung, Coulomb potential, Dirac equation, Distribution, Electron, Energy, Gamma, Measurement, Ray, Scattering, Spectral.

For abstract, see S 04 15.

N66-28235 **Field 20H**
CFSTI Prices HC$3.00 MF$0.50
Laboratoire De Physique Theorique Et Des Hautes Energies, Orsay (France).
SUM RULES FOR COMPTON SCATTERING, I.
by M. Gourdin. 2 May 66, 59p TH/146

Descriptors: *Compton effect, *Elastic scattering, *Symmetry, Amplitude, Elastic, Isotopy, Nucleon, Particle, Photon, Physics, Rule, Scattering, Spin, Sum, Theoretical.

For abstract, see S 04 15.

N66-28518 **Field 20H**
CFSTI Prices HC$2.00 MF$0.50
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
COLLISION FREQUENCIES AND ENERGY TRANSFER-IONS SCIENTIFIC REPORT NO. 272.
by P. M. Banks. 15 May 66, 43p NASA-CR-75640
Grant NSG-134-61

Descriptors: *Energy transfer, *Ionic collision, *Resonance charge exchange, Behavior, Charge, Collision, Energy, Exchange, Gas, Ionic, Maxwell distribution, Momentum, Neutral, Rate, Resonance, Thermal, Transfer.

For abstract, see S 04 16.

N66-28583 **Field 20H**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
YIELD MEASUREMENTS ON COLLISION OF SLOW ELECTRONS WITH INERT GAS ATOMS.
Ausbeutemessungen Bein Stoss Langsamer Elektronen Mit Edelgasatomen
by H. Maier-leibnitz. Jun 66, 41p NASA-TT-F-10171
Transl. Into English From Z. Physik (Berlin), V. 95, 1935 P 499- 523

Descriptors: *Argon, *Electron collision, *Excitation, *Helium, *Neon, Collision, Electric, Electron, Gas, Inert, Ionization, Measurement, Multiple, Potential, Probability, Slow, Velocity, Yield.

For abstract, see S 04 16.

N66-29345 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
PHYSICS OF COSMIC RAYS.
Fizika Kosmicheskikh Luchey
by G. D. Zhdanov. Apr 64, 11p NASA-TT-F-8684, ST-CR-10124
Contract NAS5-2078
Center, Apr. 1964 11 P Transl. Into English From Priroda (Moscow), No. 2, Feb. 1964 P 82-87

Descriptors: *Cosmic ray, *Nuclear physics, *Particle acceleration, *Radiation belt, Acceleration, Belt, Cosmic, Fireball, Instrument, Nuclear, Particle, Physics, Radiation, Ray, Sounding, Space.

For abstract, see S 04 16.

N66-29354 **Field 20H**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ADVANCES IN PARTICLES AND FIELD RESEARCH IN THE SATELLITE ERA.
by W. Hess, G. Mead, and M. P. Nakada. Jan 65, 68p NASA-TM-X-55240, X-640-65-39
Submitted For Publication

Descriptors: *Cosmic ray, *Magnetic field, *Neutron physics, *Radiation belt, *Solar wind, Aurora, Belt, Cosmic, Earth, Effect, Field, Ground, Magnetic, Measurement, Neutron, Particle, Physics, Radiation, Ray, Satellite, Solar, Wind.

For abstract, see S 04 16.

N66-29376 **Field 20H**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
AN ANALYTICAL AND EXPERIMENTAL INVESTIGATION OF NONADIABATIC PARTICLE LOSSES IN AXISYMMETRIC AND MULTIPOLAR MAGNETIC FIELDS.
by J. R. Roth. 13 Sep 65, 34p NASA-TM-X-56894
Submitted For Publication

Descriptors: *Charged particle, *Magnetic mirror, *Multipolar field, *Nonadiabatic theory, Axisymmetry, Behavior, Charge, Computer, Condition, Equation, Field, Geometry, Initial, Magnetic, Mirror, Multipole, Nonadiabatic, Nonlinear, Nonrelativistic, Parameter, Particle, Single, Superimposition, Theory.

For abstract, see S 04 16.

N66-29380 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
THE EXTREMA-EFFECT IN TOTAL ELASTIC MOLECULAR BEAM SCATTERING CROSS SECTIONS FOR CHARACTERIZATION OF THE POTENTIAL WELL.
by R. B. Bernstein, and T. J. Obrien. 5 Jun 65, 24p NASA-CR-67564, WIS-TCI-100
Grant NSG-275-62
Presented At The Gen. Discussion Of The Faraday Soc. On Intermol. Forces, Bristol Univ., England, 14-16 Sep. 1965

Descriptors: *Extremum value, *Molecular spectrum, *Particle beam, *Potential energy, *Scattering cross section, Beam, Characterization, Cross section, Curvature, Depth, Effect, Elastic, Energy, Equation, Extreme, Mathematics, Molecular, Particle, Potential, Scattering, Separation, Spectrum, Value, Velocity, Well.

For abstract, see S 04 16.

N66-29416 **Field 20H**
CFSTI Prices HC$3.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
THE ISOTOPIC SPIN OF LIGHT NUCLEI.
by A. Baz, and YA. Smorodinskiy. Feb 63, 59p NASA-TT-F-8402
Transl. Into English From Usp. Fiz. Nauk (Ussr), V. 55, No. 2, Feb. 1955 P 215-264

Descriptors: *Isotopic spin, *Nuclear spin, *Nucleon, Charge, Independence, Isotopy, Level, Light, Nuclear, Physics, Spectral, Spin, Structure, Theoretical, Theory.

For abstract, see S 04 16.

N66-29422 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
ROLE OF THE POLARIZATION EFFECTS AT INELASTIC COLLISIONS OF ELECTRONS WITH ATOMS.
Rol' Polyarizatsionnykh Effektov Pri Neuprugikh Stolknoveniyakh Elektronov S Atomami
by G. F. Drukayev, and V. D. Obyedkov. Oct 63, 14p NASA-TT-F-8632, ST-NPH-10054
Contract NAS5-2078
Transl. Into English From Atomnyye Stolknoveniya (Riga), V. 13, 1963 P 55-66

Descriptors: *Atomic collision, *Electron collision, *Inelastic collision, *Polarization, Atom, Collision, Computation, Cross section, Density, Distance, Electron, Equation, Excitation, Expansion, Inelasticity, Low energy, Potential.

For abstract, see S 04 16.

N66-29423 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
RADIAL EQUATIONS OF THE THEORY OF ATOMIC COLLISIONS.
Radial'nyye Uravneniya Teorii Atomnykh Stolknoveniy
by L. A. Vaynshteyn. Oct 63, 23p NASA-TT-F-8631, ST-NPH-10053
Contract NAS5-2078
Transl. Into English From Atomnyye Stolknoveniya (Riga), V. 13, 1963 P 67-86

Descriptors: *Elastic scattering, *Inelastic scattering, *Polarization, Adiabat, Approximation, Atom, Collision, Differential, Distortion, Elastic, Electron, Equation, Inelasticity, Integral, Operator, Potential, Radial, Scattering, Wave.

For abstract, see S 04 16.

N66-29432 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
X-RAY EMISSION OF FLARES ORIGINATING BEHIND THE SOLAR DISK.
Rentgenovskiye Izlucheniya Vspyshek Voznikayushchikh Za Limbom Solnechnogo Diska
by YU. I.Vinogradov, and N. N. Yeryushev. 20 Nov 63, 10p NASA-TT-F-8641, ST-SP-10069
Contract NAS5-2078
Transl. Into English From Izv. Krymsk. Astrofiz. Observ. (Moscow), V. 29, 1963 P 141-145

Descriptors: *Emission, *Solar flare, *Sudden ionospheric disturbance (sid), *X-ray, Concentration, Disk, Disturbance, Electron, Flare, Glow, Ionosphere, Limb, Occurrence, Sid, Solar, Sudden.

For abstract, see S 04 16.

N66-29437 **Field 20H**
CFSTI Prices HC$2.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge.

COLLISION INDUCED TRANSITIONS WITHIN EXCITED LEVELS OF NEON.
by A. Javan, and J. H. Parks. 1964, 30p NASA-CR-60387
Grant NSG-330

Descriptors: *Atomic collision, *Energy level, *Excited state, *Neon, *Quantum mechanics, Atom, Collision, Electron, Energy, Excitation, Field, Level, Maser, Mechanics, Optical, Quantum, Resonator, State, Transition.

For abstract, see S 04 16.

N66-29440 **Field 20H**
CFSTI Prices HC$3.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
STATE OF THE ART AND CERTAIN NEW DEVELOPMENTS IN THE MOLECULAR BEAM METHOD.
Sovremennoye Sostoyaniye I Nekotoryye Novyye Rezul'taty Metoda Molekulyarnogo Puchka
by V. B. Leonas. May 64, 58p NASA-TT-F-8879
Transl. Into English From Usp. Fiz. Nauk (Moscow), V. 82, No. 2, 1964 P 287-323

Descriptors: *Molecular beam, *Physical chemistry, *Surface interaction, Beam, Charge, Chemistry, Escape, Furnace, Gas, Interaction, Molecular, Optics, Physical, Pulse, Solid, Source, Surface, Transfer, Vacuum.

For abstract, see S 04 16.

N66-29462 **Field 20H**
CFSTI Prices HC$2.00 MF$0.50
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
COLLISION FREQUENCIES AND ENERGY TRANSFER- ELECTRONS.
by P. M. Banks. 1 May 66, 41p NASA-CR-75889
Grant NSG-134-61
Its Sci. Rept.-271

Descriptors: *Elastic collision, *Energy transfer, *Gas mixture, *Maxwell distribution, Collision, Cross section, Elastic, Electron, Energy, Frequency, Gas, Ion, Mixture, Neutral, Particle, Transfer, Velocity.

For abstract, see S 04 16.

N66-29473 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
APPLICATION OF THE MULTI-CONFIGURATION APPROXIMATION TO THE DETERMINATION OF THE DIPOLE FORCE FOR ATOMS OF THE BERYLLIUM AND BORON TYPES.
Primeneniye Mnogokonfiguratsionnogo Priblizheniya Pri Opredelenii Sily Dipola Dlya Atomov Tipa Berilliya I Bora
by A. B. Bolotin, and A. P. Yutsis. Jun 63, 19p NASA-TT-F-8446
Transl. Into English From Zh. Eksperim. I Teor. Fiz. (Moscow), V. 24, 1953 P 537-544

Descriptors: *Approximation method, *Beryllium, *Boron, *Wave function, Approximation, Atom, Configuration, Constant, Dipole, Force, Function, Method, Multiple, Transition, Wave.

For abstract, see S 04 16.

N66-29474 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ON VAINSHTEIN'S METHOD APPLIED TO THE ELECTRON IMPACT EXCITATION AND IONIZATION OF ATOMS.
by K. Omidvar. Jun 66, 24p NASA-TM-X-55501, X-641-66-245

Descriptors: *Approximation method, *Atomic excitation, *Electron impact, Amplitude, Approximation, Atom, Collision, Cross section, Electron, Energy, Exchange, Excitation, Impact, Integral, Ionization, Method, Threshold.

For abstract, see S 04 16.

N66-29475 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INVERSE L TO I TRANSFORMATION.
by E. G. Stassinopoulos. Apr 66, 20p NASA-TM-X-55502, X-642-66-273

Descriptors: *Geomagnetically trapped particle, *Mapping, *Radiation belt, Adiabat, Belt, Coordinate, Distribution, Field, Geomagnetic, Integral, Invariance, Longitudinal, Magnetic, Parameter, Particle, Radiation, Second, Shell, Trapping.

For abstract, see S 04 16.

N66-29510 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Trw Systems, Redondo Beach, Calif. Space Sciences Lab.
CONDUCTIVE HEATING OF THE SOLAR WIND. III - BREAKDOWN OF THE NAVIER-STOKES EQUATIONS, 4 JUNE - 4 DECEMBER 1965.
by F. L. Scarf. 1965, 11p NASA-CR-75929
Contract NASW-1226

Descriptors: *Flow pattern, *Navier-stokes equation, *Solar wind, Astrophysics, Coefficient, Conductivity, Flow, Fluid, Geophysics, Heating, Pattern, Physics, Solar, Subsonic, Supersonic, Transport, Wind.

For abstract, see S 04 16.

N66-29968 **Field 20H**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOLAR MODULATION OF GALACTIC COSMIC RAYS.
by V. K. Balasubrahmanyan, E. Boldt, and R. A. Palmeira. May 66, 38p NASA-TM-X-55500, X-611-66-226

Descriptors: *Cosmic radiation, *Galactic radiation, *Helium, *Proton, *Solar effect, Cosmic, Effect, Field, Galaxy, Inhomogeneity, Magnetic, Mechanism, Modulation, Nucleus, Radiation, Ratio, Solar, Wind.

For abstract, see S 04 16.

N66-29971 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Chicago Univ., Ill. Enrico Fermi Inst. For Nuclear Studies.
GALACTIC DEUTERIUM AND ITS ENERGY SPECTRUM ABOVE 20 ME V PER NUCLEON.
by C. Y. Fan, G. Gloeckler, and J. A. Simpson. 1966, 18p NASA-CR-76073, EFINS-66-58
Grant NSG-179-61, Contract AF 49/638/-1642

Descriptors: *Cosmic radiation, *Deuterium, *Imp, *Satellite measurement, Activity, Cosmic, Differential, Energy, Flux, Galaxy, Helium, Interstellar, Matter, Measurement, Minimum, Nucleon, Proton, Radiation, Satellite, Solar, Spectrum.

For abstract, see S 04 16.

N66-29980 **Field 20H**
CFSTI Prices HC$5.00 MF$1.25
Illinois Univ., Urbana. Dept. Of Physics.
RECOMBINATION LIFETIMES IN GAMMA-IRRADIATED SILICON.
by R. A. Hewes. Jun 66, 188p NASA-CR-76090
Grant NSG-228-62

Descriptors: *Cobalt 60, *Gamma radiation, *Lifetime, *Recombination, *Silicon, Boron, Center, Defect, Function, Gamma, N type, P type, Phosphorus, Radiation, Resistivity, Temperature.

For abstract, see S 04 16.

N66-35675 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Centro Brasileiro De Pesquisas Fisicas, Rio De Janeiro.
ELECTRON SPIN RESONANCE OF TRAPPED ELECTRONS IN IRRADIATED SODIUM NITROPRUSSIDE.
by J. Danon, R. P. Muniz, and H. Panepucci. 1965, 11p
Its Nota De Fis., Vol. 11, No. 19

Descriptors: *Electron spin resonance, *Nitro compound, *Sodium compound, *Trapped particle, Accelerator, Compound, Defect, Electron, Irradiation, Linear, Nitro, Particle, Resonance, Sodium, Spectrometer, Spin, Trap.

For abstract, see S 04 21.

N66-35730 **Field 20H**
CFSTI Prices HC$3.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge. Tokyo Univ. (Japan). Lab. For Nuclear Science.
X-RAY AND GAMMA-RAY ASTRONOMY.
by M. Oda. 1965, 55p NASA-CR-68523
Grant NSG-386, Contract AT/30-1/-2098
Presented At The Cosmic Ray Conf., London, 6-17 Sep. 1965

Descriptors: *Cosmic radiation, *Gamma radiation, *Supernova, *X-ray, Astronomy, Collimator, Cosmic, Counter, Detector, Galaxy, Gamma, Generation, Instrument, Intensity, Radiation, Ray, Rocket, Scintillation, Sounding, Source.

For abstract, see S 04 21.

N66-35796 **Field 20H**
CFSTI Prices HC$4.00 MF$1.00
Harvard Coll. Observatory, Cambridge, Mass. Shock Tube Spectroscopy Lab.
THE THEORY OF DISPERSION PROFILES IN ATTENUATION SCIENTIFIC REPORT NO. 13.
by B. W. Shore. Jul 66, 120p NASA-CR-77665
Grant NSG-438

Descriptors: *Collision, *Dispersion, *Perturbation theory, *Resonance, Absorption, Attenuation, Autoionization, Cross section, Gas, Line, Matrix, Perturbation, Photon, Profile, Refraction, Scattering, Spectral, Theory.

For abstract, see S 04 21.

N66-35962 **Field 20H**
CFSTI Prices HC$1.00 MF$0.50
Radio Corp. Of America, Princeton, N. J.
STUDY OF INELASTIC ELECTRON-MOLECULE COLLISIONS PROGRESS REPORT NO. 1, 21 MAR. - 30 JUN. 1966.
1966, 14p NASA-CR-77765
Contract NAS5-9303

Descriptors: *Electron collision, *Inelastic collision, *Ion recombination, *Molecular collision, *Nitrogen ion, Calculation, Collision, Dissociation, Electron, Inelasticity, Ion, Molecular, Nitrogen, Recombination, Theory.

For abstract, see S 04 21.

N66-36065 Field 20H
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE PROPAGATION OF LOW ENERGY CHARGED PARTICLES IN THE INNER SOLAR SYSTEM.
by V. K. Balasubrahmanyan, and G. Skadron. Aug 66, 41p NASA-TM-X-57880, X-611-66-365
Grant NSG-695
Prepared In Cooperation With Md. Univ.

Descriptors: *Charged particle, *Cosmic ray propagation, *Interplanetary magnetic field, *Solar system, Charge, Convection, Cosmic, Diffusion, Drift, Effect, Field, Inner, Interplanetary, Low energy, Magnetic, Particle, Propagation, Ray, Solar, System.

For abstract, see S 04 21.

N66-36092 Field 20H
CFSTI Price MF$1.25
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
THE APPLICATION OF PERTURBATION THEORY TOWARD THE DETERMINATION OF MOLECULAR ENERGIES AND PROPERTIES.
by R. L. Matcha. 15 Oct 66, 209p NASA-CR-68530, WIS-TCI-129
Grant NSG-275-62
Submitted For Publication In Two Parts

Descriptors: *Molecular energy, *Perturbation theory, *Variation method, Calculation, Element, Energy, Function, Ground, Hydrogen, Integral, Matrix, Method, Molecular, Perturbation, Property, Rayleigh-schroedinger perturbation theory, Schroedinger equation, State, Theory, Variation, Wave.

For abstract, see S 04 21.

N66-36096 Field 20H
CFSTI Prices HC$2.00 MF$0.50
Columbia Univ., New York. Radiation Lab.
LIFETIMES AND GJ FACTORS IN EXCITED STATES OF CHROMIUM. HYPERFINE STRUCTURE OF CR53.
by H. Bucka, B. Budick, R. J. Goshen, and S. Marcus. 1965, 34p NASA-CR-68489
Grant NSG-360, Contract DA-36-039-SC-90789
Submitted For Publication

Descriptors: *Chromium, *Hyperfine structure, *Radioactive isotope, Crossing, Double, Electronic, Hyperfine, Isotope, Level, Lifetime, Nuclear, Property, Radioactivity, Resonance, Spectroscopy, Structure.

For abstract, see S 04 21.

N66-36097 Field 20H
CFSTI Prices HC$1.00 MF$0.50
Columbia Univ., New York. Radiation Lab.
CORE POLARIZATION IN CHROMIUM-53.
by B. Budick, R. J. Goshen, S. Jacobs, and S. Marcus. 1965, 24p NASA-CR-68494
Grant NSG-360, Contract DA-36-039-SC-90789
Submitted For Publication

Descriptors: *Chromium, *Hyperfine structure, *Polarization, *Radioactive isotope, Constant, Core, Coupling, Effect, Excitation, Field, Hyperfine, Isotope, Magnetic, Radioactivity, Relativity, State, Structure, Zeeman effect.

For abstract, see S 04 21.

N66-36324 Field 20H
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PROBABILITIES OF SOLAR FLARE OCCURRENCE.
by W. T. Roberts. 18 May 66, 20p NASA-TM-X-53463

Descriptors: *Environment model, *Solar flare, Construction, Damage, Design, Effect, Environment, Flare, Model, Occurrence, Probability, Shield, Solar, Vehicle.

For abstract, see S 04 21.

N66-36424 Field 20H
CFSTI Prices HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
NEUTRON PHYSICS DIVISION ANNUAL PROGRESS REPORT, PERIOD ENDING 31 MAY 1966.
by A. D. Callihan, and F. C. Maienschein. Sep 66, 42p NASA-CR-77961, ORNL-3973, VOL. II
Contract NASA ORDER R-104, W-7405-ENG-26

Descriptors: *Detector, *Neutron physics, *Radiation shielding, Abstract, Collision, Gamma, Germanium, High energy, Lithium, Monte carlo method, Neutron, Nuclear, Physics, Radiation, Ray, Scattering, Shielding, Space vehicle, Spectrometer.

For abstract, see S 04 21.

PB-170 934 Field 20H
CFSTI Prices: HC$2.60 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
QUELQUES PROPRIETES DES REACTIONS A DEUX CORPS DANS LES INTERACTIONS NEGATIVE-K -p A 3 GeV/c (Some General Features of two Body Reactions in Interactions at 3 GeV/c),
by Jean Badier, Michel Demoulin, Jacques Goldberg, Bernard P. Gregory, and Claude Pelletier. Jun 66, 22p CEA-R-3037
Text in French; Summary in English.

Descriptors: (*K mesons, Meson reactions), (*Proton reactions, Nuclear cross sections), (*Meson reactions, Nuclear cross sections), Hyperons, Baryons, Nuclear spins, V particles, Pions, Antiparticles, France.

Identifiers: Y particles.

The differential and total cross sections of two body reactions produced in 3 GeV/c Negative-K -proton collisions are presented. Their variation as a function of the baryonic number, strangeness, and isospin of the t and u cross channels is analysed, as well as some implications of a baryon exchange mechanism. (Author)

AD-639 652 See Field 7D

AD-639 671 See Field 18K

AD-639 758 See Field 6R

AD-639 776 See Field 20J

AD-639 789 See Field 3B

AD-639 815 See Field 20J

AD-639 816 See Field 20J

AD-639 817 See Field 20J

AD-639 818 See Field 20J

AD-639 819 See Field 20J

AD-639 822 See Field 20J

AD-639 824 See Field 20J

AD-639 825 See Field 20J

AD-639 826 See Field 20J

AD-639 879 See Field 4A

AD-639 886 See Field 20J

AD-639 919 See Field 20G

AD-639 972 See Field 20J

AD-639 975 See Field 20J

AD-639 976 See Field 20J

AD-639 984 See Field 20J

AD-640 260 See Field 18F

AD-640 400 See Field 20J

ANL-7182 See Field 11F

IDO-17182 See Field 6R

LA-3498 See Field 18D

MLM-1299 See Field 7E

NBS-TN-410 See Field 9B

ORO-647 See Field 22A

PB-170 922 See Field 20G

UCRL-16554 See Field 20G

UCRL-16741 See Field 20G

20I. PLASMA PHYSICS

AD-454 732 Field 20I, 18K
CFSTI Prices: HC$5.60
Aerojet-General Nucleonics, San Ramon, Calif.
THE FRACTION OF EFFUSING MOLECULES STRIKING A COLLECTOR PLATE OVER A CIRCULAR CAPILLARY.
Interim technical rept.,
by A. R. Miller. Dec 64, 60p AN-1328
Contract DA-44-009-AMC-829 (X)
Task 3.2.2

Descriptors: (*Vapor pressure, Determination), (*Capillary tubes, Vaporization), Orifices, Fluid flow, Vacuum, Gas flow, Programming (Computers), Probability.

Angular distribution probabilities of molecular effusion through circular capillaries have been calculated for 46 values of length-to-radius and every integral value of the distributional angle. (Author)

AD-468 563 Field 20I, 20D
CFSTI Prices: HC$4.60 MF$0.50
Virginia Univ., Charlottesville.
EXPERIMENTAL MEASUREMENT OF THE GROWTH OF A TURBULENT MERCURY JET IN A COAXIAL MAGNETIC FIELD,
by Miklos Sajben, and James A. Fay. Jul 65, 41p
Contract Nonr-3623 (00)
Proj. NR-098 038
Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge under rept. number MIT-38-P. Report on Project Squid.

Descriptors: (*Magnetohydrodynamics, Turbulence), (*Jet mixing flow, Mercury), Liquid jets, Liquid metals, Magnetic fields, Velocity, Intensity, Reynolds number, Measurement, Secondary flow.

Identifiers: Squid project.

Using a hot wire system developed for this purpose, measurements of the velocity were made in a circular liquid mercury jet issuing into a low speed secondary flow and subject to a uniform axial magnetic field. The Reynolds number of the jet was about 10,000 while the magnetic interaction parameter varied from zero to slightly over one. The jet was strongly turbulent under all conditions investigated. The radial distribution of the mean and fluctuating component of the meridional

velocity was measured at four axial stations located between 2 and 34 diameters from the nozzle exit. The results indicate that the rate of spreading of the jet is decreased, that the shape of the velocity profile changes and that the turbulent intensity decreases with increasing magnetic field strength. The high frequency components of the fluctuations in the secondary flow seem to be damped more strongly than fluctuations at low frequencies, while the reverse is observed within the core of the jet.

AD-483 745 **Field 201, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Virginia Univ., Charlottesville.
CATALYZED ENHANCEMENT OF CHEMI-IONIZATION IN ATOMIC N AND O MIXTURES,
by Authur Fontijn, and Pieter H. Vree. May 66, 12p Technical rept. AC-5-P
Contract Nonr-3623 (00)
Proj. NR-098-038
Prepared in cooperation with AeroChem Research Labs., Inc., Princeton, N. J. Report on Project Squid.

Descriptors: (*Gas ionization, Reaction kinetics), (*Catalysis, Mixtures), Ionization, Molecules, Excitation, Recombination reactions, Wake, Plasma sheath, Atmosphere entry, Ionization trails, Concentration (Chemistry), Optimization, Ions, Nitrogen, Oxygen, Hydrocarbons, Halogenated hydrocarbons, Fluorine compounds, Fuel additives, Gaseous rocket propellants.

It has been found that halocarbon and hydrocarbon molecules can catalytically enhance ionization levels in atomic N-O afterglows. It is shown that this phenomenon can be attributed to an increase in the concentration of excited N2 and/or NO molecules. It is possible that similar enhancement phenomena can increase the ionization level of re-entry wakes.

AD-639 626 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
California Univ., Los Angeles. Dept. of Physics.
THE KINETIC EQUATION FOR AN UNSTABLE PLASMA IN PARALLEL ELECTRIC AND MAGNETIC FIELDS,
by Burton D. Fried, and Sidney L. Ossakow. Nov 65, 28p R-3
Contract Nonr-4756 (01)

Descriptors: (*Plasma medium, Kinetic theory), Stability, Equations, Electric fields, Magnetic fields.

The response of a homogeneous plasma, in a strong uniform magnetic field, to the sudden application of a strong, uniform electric field is studied in a self-consistent formulation which treats the coupled equations for the one-particle and two-particle distribution functions resulting from neglect of three-particle correlations. The electric field is assumed to be large compared to that which produces a 'runaway current', so that particle-wave interactions should dominate. Only the dominant contributions to the diffusion in velocity space, arising from the fastest growing waves, are retained. (Author)

AD-639 629 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
California Univ., Los Angeles. Dept. of Physics.
STABILITY LIMITS FOR LONGITUDINAL WAVES IN ION BEAM-PLASMA INTERACTION,
by Burton D. Fried, and Alfred Y. Wong. 31 Aug 65, 27p
Contract Nonr-4756 (01)
Prepared in cooperation with TRW Systems, Redondo Beach, Calif. Physical Research Div. rept. no. 9801-6015-RU-000.

Descriptors: (*Plasma medium, *Ion beams), Stability, Wave transmission, Velocity, Temperature, Density.

The two stream instability is examined for the case of an ion beam traversing a plasma. The dispersion equation for linearized, longitudinal waves in a plasma where collisions are negligible is used to find the restrictions on beam velocity, temperature and density which will lead to growing waves. (Author)

AD-639 754 **Field 201, 10B**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Philadelphia, Pa. Missile and Space Div.
MHD GENERATOR AND ACCELERATOR EXPERIMENTS IN SEEDED AND UNSEEDED AIR FLOWS.
Technical Information series,
by Clarence J. Harris, Charles H. Marston, and Walter R. Warren Jr. Sep 66, 29p R66SD50
Contracts AF 04 (647)-269, AF 40 (600)-1091

Descriptors: (*Magnetohydrodynamic generators, Attitude control systems), (*Gas flow, Electrical conductance), Plasma accelerators, Blunt bodies, Feasibility studies, Shock waves, Magneto-optic effect, Kinetic energy.

Two types of MHD experiments were conducted using air flows produced by hypersonic shock tunnels. One experimental program was designed to evaluate the feasibility of using the Lorenz forces developed in an MHD generator for the attitude control of a hypervelocity vehicle. During this study the electrical conductivity of the seeded shock layer flow about a blunt model located in the shock tunnel test section was investigated along with the effect of pre-heating the generator electrodes. In the second experimental program, a Faraday accelerator is being studied to determine its ability to add kinetic energy to a high density, unseeded air flow in a high enthalpy shock tunnel. Measurements were made of the gross electrical conductivity of the flow, with and without an applied magnetic field. The meaning of the electrical conductivity measurements for each of these experiments is discussed. (Author)

AD-639 756 **Field 201, 7D**
CFSTI Prices: HC$3.00 MF$0.75
Johns Hopkins Univ., Baltimore, Md. Dept. of Physics.
STARK BROADENING OF AI AND AII AT HIGH ELECTRON CONCENTRATION.
Technical rept.,
by W. Richard Powell, and Donald E. Kerr. Apr 66, 100p TR-3
Contract Nonr-4010 (10)
Proj. NR-012-304

Descriptors: (*Argon, Line spectrum), (*Plasma medium, *Line spectrum), (*Stark effect, Plasma medium), Atomic energy levels, Electron transitions, Plasma generators, Probability, Equations, Electrons, Concentration (Chemistry).

Stark-broadened profiles for several AI and AII lines were measured. These results were compared with Griem's theoretical predictions. The shifts and widths observed for AI lines were less than predicted, but the difference did not exceed the combined theoretical and experimental uncertainties. However, the profiles observed were less symmetric than those predicted. A highly reproducible transient plasma generator was developed for this study. The characteristics of this source were investigated to some extent and the homogeneity along the line of sight was investigated in detail. The temperature of the plasma was determined from measurements of the absolute intensities of spectral lines of AI and AII. For calculation of this temperature, a single noniterative equation was derived. The range of validity of this equation was explored. Electron concentrations were also derived from measurements of absolute intensities. Some comments with regard to current argon transition probabilities are made. (Author)

AD-639 831 **Field 20I**
Not available from CFSTI.
University Coll., Cork (Ireland). Dept. of Electrical Engineering.
FREQUENCY MODULATED TECHNIQUE FOR THE STUDY OF THE TONKS-DATTNER RESONANCES,
by A. A. Cremin, and M. C. Sexton. 2 Dec 65, 4p
Grant AF-EOAR-46-65
Proj. AF-9767
Task 976703
AFOSR-66-1547
Prepared in cooperation with English Electric Valve Co., Ltd., Chelmsford (England).
Availability: Published in Electronics Letters v1 n10 Dec 1965.

Descriptors: (*Plasma medium, Resonance), Frequency modulation, Microwaves, Backward-wave oscillators.

A new method of observing the resonance spectrum of a plasma column irradiated by microwave energy is described. Using a frequency-swept backward-wave oscillator, the resonances are observed as a function of frequency under constant plasma conditions. (Author)

AD-639 858 **Field 201, 20D**
Not available from CFSTI.
Strathclyde Univ., Glasgow (Scotland). Dept. of Mathematics.
MAGNETO-GASDYNAMIC FLOW OVER A WEDGE,
by D. C. Pack, and G. W. Swan. 3 Sep 65, 17p
Grant AF-EOAR-58-65
Proj. AF-9749
Task 974901
AFOSR-66-1383
Availability: Published in Journal of Fluid Mech. v25 pt1 p165-78 1966.

Descriptors: (*Magnetohydrodynamics, *Wedges), Gas flow, Gas ionization, Shock waves, Perturbation theory, Magnetic fields, Stability, Great Britain.

The solution for the flow of a fully ionized gas over a wedge of finite angle is known for the case when the applied magnetic field is aligned with the incident stream. In this flow there are current sheets on the surfaces of the wedge. When the magnetic field is allowed to deviate slightly from the stream, the current sheets may move into the gas and become shock waves. The magnetic fields adjacent to the wedge above and below it have to be matched. A perturbation method is introduced by means of which expressions for the unknown quantities in the different regions may be determined when there are four shocks attached to the wedge. The results give insight into the manner in which the shock-wave pattern develops as the obliquity of the magnetic field to the stream increases. The question of the stability of the shock waves is also examined. (Author)

AD-639 859 **Field 201, 20D**
Not available from CFSTI.
Strathclyde Univ., Glasgow (Scotland). Dept. of Mathematics.
THE STABILITY OF ATTACHED SHOCK WAVES IN MAGNETOGASDYNAMIC FLOW PAST A WEDGE,
by D. C. Pack, and G. W. Swan. 3 Jun 65, 9p
Grant AF-EOAR-58-65
Proj. AF-9749
Task 974901
AFOSR-66-0658
Availability: Published in Journal of the Institute of Mathematics and Its Applications v1 n4 p317-22 Dec 1965.

Descriptors: (*Magnetohydrodynamics, Shock waves), (*Shock waves, Stability), (*Wedges, Magnetohydrodynamics), Supersonic flow, Great Britain.

The question of the physical significance of the new phenomena indicated by Cabannes' work on magnetogasdynamic flow past a wedge is consi-

dered from the point of view of the stability of the shock waves. Analytical and heuristic reasons are given suggesting that downstream-facing shocks are stable if the upstream flow is supersonic and unstable if it is subsonic, while upstream facing shocks are always to be considered unstable. (Author)

AD-639 876 **Field 20I**
Not available from CFSTI.
Center for Radiophysics and Space Research, Cornell Univ., Ithaca, N. Y.
MOTION OF A TEST PARTICLE IN A PLASMA,
by Francis Perkins. 2 Dec 64, 9p
Contract AF 49 (638)-1156
AFOSR-66-1443
Availability: Published in The Physics of Fluids v8 n7 p1361-7 Jul 1965.

Descriptors: (*Plasma medium, Kinetic theory), Statistical functions, Transport properties, Approximation (Mathematics), Errors, Charged particles.

The motion of a charged test particle in a completely ionized gas without a magnetic field is investigated. The possible trajectories of this test particle are described by a distribution function that spreads out in phase space as time increases. A convergent kinetic equation which accounts for long-range collective effects and short-range collisions in a consistent manner is derived to describe the time evolution of the distribution function. Expressions for the energy loss rate and dynamical friction are calculated from appropriate moments of the kinetic equation, and they show how the Coulomb logarithm, ln, varies with the velocity of the test particle. The errors introduced by the use of a convergent kinetic equation are estimated, and these indicate that the kinetic equation method gives the test particle's diffusion in phase space only on coarse grained time and spatial scales. For the case of a fast electron, the time scale must be larger than the electron plasma period and the spatial scale larger than e squared/KT. (Author)

AD-639 909 **Field 20I, 20D**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
SPLITTING OF A NONEVOLUTIONARY PARALLEL SHOCK WAVE.
Translation series,
by K. P. Cherkasova. 18 Aug 66, 9p TG-230-T488
Contract NOw-62-0604
TT-66-62384
Trans. of Akademiya Nauk SSSR. Izvestiya. Mekhanika, n5 p146-8 1965.

Descriptors: (*Shock waves, Separation), Propagation, Magnetic fields, Magnetohydrodynamics, Mathematical analysis, USSR.

It is shown that if the magnetic field is slightly oblique relative to the direction of shock-wave propagation, the waves that form separate.

AD-639 956 **Field 20I**
CFSTI Prices: HC$3.00 MF$0.50
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
LIMITING CASES IN THE THEORY OF SPHERICAL PLASMA PROBES,
Internal scientific rept.,
by Karl G. Guderley. Jun 66, 82p ARL-66-0113
Proj. 7071
Task 707103

Descriptors: (*Plasma physics, *Probes), Theory, Spheres, Numerical analysis, Differential equations.

The field around the probe in a monoenergetic plasma depends upon the probe radius (made dimensionless with a Debye length), the probe potential and the ratio of the energies of the repelled and the attracted charge carriers. The present report investigates conditions where some of these parameters become either very large or very small. The investigations round out the results of a former report, where only finite values of these parameters were considered. To obtain the desired limiting behavior formal limiting processes are carried out in the differential equation that governs the field around the probe. This method is by no means new, but the variety of examples that occur in the present problem might be rather instructive. For some of the limiting processes numerical results have been included. (Author)

AD-640 064 **Field 20I, 9A**
CFSTI Prices: HC$1.00 MF$0.50
Sylvania Electronic Systems-East, Waltham, Mass. Applied Research Lab.
GUIDED WAVES SUPPORTED BY LAYERS OF A LOSSY COMPRESSIBLE PLASMA,
by J. Galejs. 25 Jul 66, 36p Scientific-3
Contract AF 19 (628)-5718
Proj. AF-4642
Task 464202
AFCRL-66-552

Descriptors: (*Plasma oscillations, Power), (*Waveguides, Plasma medium), Compressive properties, Mathematical analysis.

A planar slab of isotropic compressible lossy plasma is bounded either by free space on both sides or by free space and a ground plane, and is excited by line sources. After establishing the dispersion relations the power carried by the waves is calculated. The total power of the many waves which depend on the resonances of the plasma waves in the transverse dimension of the slab is about two orders of magnitude lower than the power of the surface waves guided along the plasma boundary for frequencies which are somewhat higher than the plasma frequency. The excitation efficiency of the transversely resonant waves is decreased for thick layers of a lossy plasma, but the losses can be neglected if the layer thickness is of the order of free space wavelength and the loss tangent of the plasma is less than 0.01. (Author)

AD-640 245 **Field 20I, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Michigan Univ., Ann Arbor. Dept. of Physics.
PLASMAS OF MERCURY IN A PRESSURE-DRIVEN SHOCK TUBE.
Final rept.,
by Otto Laporte. Sep 66, 10p
Grant AF-AFOSR-934-65
Proj. AF-9750
Task 975001
AFOSR-66-1939

Descriptors: (*Plasma medium, *Mercury), (*Shock tubes, Design), Vapors, Shock waves, Heating, Line spectrum.

A pressure driven shock tube to produce shock waves in mercury vapor was constructed and is described and figured in the report. In order to have sufficient mercury density it is necessary to heat the entire tube to 400C. It is intended to make spectroscopic studies of the essential lines of mercury, especially the 2537A line as emitted by the shock heated vapor. It is expected that the actual measurement phase of the project will commence during the coming year. (Author)

AD-640 372 **Field 20I, 20N**
CFSTI Prices: HC$1.00 MF$0.50
Royal Inst. of Tech., Stockholm (Sweden). Microwave Dept.
GENERATION AND AMPLIFICATION OF MICROWAVES BY INTERACTION OF ELECTRON BEAMS AND PLASMA.
Annual summary rept. no. 1, 1 Jun 65-31 May 66,
by Bertil Agdur. 30 Jun 66, 12p
Contract AF 61 (052)-895
RADC-TR-66-589
See also AD-632 541.

Descriptors: (*Microwaves, *Plasma physics), Sweden, Propagation, Plasma oscillations, Wave transmission, Electron beams, Semiconductors, Lasers, Ions, Acoustics, Density.

Identifiers: Indium antimonide.

Among the problems treated are mode coupling in inhomogeneous plasmas, coupling of waves through plasma structures, non-linear wave interaction in plasmas, variation of electron density and neutral gas density along a low pressure mercury vapour discharge, microwave emission from InSb and laser diagnostics of solid state plasmas. (Author)

AD-640 401 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
Columbia Univ., New York. Plasma Lab.
BOLTZMANN'S EQUATIONS WITH BREMSSTRAHLUNG.
Interim scientific rept.,
by Alan Oppenheim. Jul 66, 42p Rept. no. 27
Contract AF 49 (638)-1634
Proj. AF-9752
Task 975201
AFOSR-66-2053

Descriptors: (*Plasma medium, Bremsstrahlung), (*Bremsstrahlung, Partial differential equations), Thermodynamics, Statistical mechanics, Statistical distributions, X rays.

Identifiers: Boltzmann equations.

The power density of bremsstrahlung radiation from a fully ionized plasma is developed from a binary collision analysis which includes the Debye shielding length in a consistent way. A cutoff in the minimum impact parameter is used which is completely consistent with a wide variety of velocity distribution functions including the Maxwellian equilibrium states. The power density is shown to vary linearly with the temperature for a Maxwellian plasma rather than with the square root of the temperature as predicted from Kramers' model. Above 4700 Kelvin the power density from the formula predicts a higher rate of bremsstrahlung emission. These results are used to develop a tractable form for inelastic collision integrals in Boltzmann's equations. Suitable moments of these Boltzmann's equations give the radiation cooling equations which replace the fluid conservation equations for momentum and energy density. The cooling terms are evaluated for Maxwellian plasma. (Author)

AD-640 418 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Florida Univ., Gainesville. Electron Devices Lab.
ELECTRON BEAM-PLASMA INTERACTION: THE PLASMA MAGNETRON.
Final rept., 1 Jan 65-1 Mar 66,
by William E. Lear, and Alan D. Sutherland. 1 Aug 66, 22p PM-1
Grant AF-AFOSR-839-65
Proj. AF-9768
Task 976801
AFOSR-66-1991

Descriptors: (*Plasma medium, *Electron beams), (*Magnetrons, Plasma medium), Oscillation, Space charges.

A low-power plasma-loaded smooth-bore magnetron is investigated experimentally. Two experimental versions are described. The first, operating under a bell-jar with a 500 gauss permanent magnet, exhibited oscillations in the range 300-500 mHz and 2-3 gHz. The second, a demountable structure operating in a variable magnetic field, exhibited oscillations in the range 970-1000 mHz. A theoretical model is discussed which postulates the interaction of the negative space-charge wave of a rotating cloud of primary electrons with the azimuthally traveling waves associated with the quasi-static modes of the plasma. The plausibility of this model is discussed but an experimental verification of its applicability was not achieved. (Author)

AD-640 486 Field 20I
Not available from CFSTI.
Innsbruck Univ. (Austria). Inst. for Theoretical Physics.
MAGNETOGASDYNAMIC FLOWS OF SMALL MAGNETIC REYNOLD'S NUMBER. PART II,
by Karl Lackner. 25 Jun 66. 35p Scientific-31
Contract AF 61 (052)-675
Proj. AF-9752
Task 975201
AFOSR-66-2252
Not reproducible by Clearinghouse standards. See also AD-623 812.

Descriptors: (*Magnetohydrodynamics, Fluid flow), Magnetic fields, Reynolds number, Austria, Two-dimensional flow, Mathematical analysis, Hall effect.

N66-27196 Field 20I
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
SOME FEATURES OF THE TRANSVERSE PROPAGATION OF HIGH FREQUENCY WAVES IN A MAGNETOACTIVE PLASMA.
O Nekotorykh Osobennostyakh Poperechnogo Rasprostraneniya Vysokochastotochnykh Voln V Magnitoaktivnoy Plasme
by B. N. Gershman. Jun 61. 10p NASA-TT-F-8019
Transl. Into English From Dokl. Akad. Nauk Sssr (Moscow), V. 137, No. 4, 1961 P 822-825

Descriptors: *High frequency, *Magnetoplasma, *Transverse wave, *Wave propagation, Electron, Mass, Plasma, Propagation, Thermal, Transverse, Velocity, Wave.

For abstract, see S 04 15.

N66-27203 Field 20I
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
THEORY OF STATIONARY PROPERTIES OF A FULLY-IONIZED CIRCUMTERRESTRIAL PLASMA.
Teoriya Statsionarnykh Svostv Polnost'yu Ionizirovanno Okolozemnoy Plazmy
by F. KH.Khakimov, and A. A. Vlasov. 18 Sep 63. 8p NASA-TT-F-8630, ST-PF-10049
Contract NAS5-2078
Transl. Into English From Dokl. Akad. Nauk Sssr, Fiz. (Moscow), V. 151, No. 4, Aug. 1963 P 819-821

Descriptors: *Ionized plasma, *Radiation belt, *Terrestrial radiation, Belt, Charge, Distribution, Earth, Ellipsoid, Field, Function, Interaction, Ionized, Magnetic, Particle, Plasma, Property, Radiation, Stationary, Terrestrial, Theory.

For abstract, see S 04 15.

N66-27315 Field 20I
CFSTI Prices HC$4.00 MF$1.00
Avco-everett Research Lab., Everett, Mass.
STUDY OF MAGNETIC ANNULAR PLASMA ACCELERATOR SUMMARY REPORT, 15 APR. 1964 - 14 JAN. 1966.
by R. M. Patrick, and A. M. Schneiderman. 1966. 126p NASA-CR-54686
Contract NAS3-5748

Descriptors: *Hall accelerator, *Magnetic annular arc, *Propulsive efficiency, Accelerator, Annulus, Arc, Axisymmetry, Efficiency, Field, Flow, High, Magnetic, Magnetohydrodynamic, Plasma, Propulsion, Thrust.

For abstract, see S 04 15.

N66-27504 Field 20I
CFSTI Prices HC$0.35 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
LIMITS OF VALIDITY OF RADIATIONLESS DECAY OF HIGH-DENSITY PLASMAS.
by N. Stankiewicz. Jun 66. 31p NASA-TN-D-3372

Descriptors: *Magnetohydrodynamic generator, *Plasma density, *Saha equation, Argon, Cesium, Decay, Density, Electron, Generator, Limit, Magnetohydrodynamic, Plasma, Power, Process, Radiative, Validity.

For abstract, see S 04 15.

N66-27529 Field 20I
CFSTI Prices HC$3.00 MF$0.75
Stanford Research Inst., Menlo Park, Calif.
THE USE OF LANGMUIR PROBES TO DETERMINE THE ELECTRON DENSITY SURROUNDING RE-ENTRY VEHICLES FINAL REPORT.
by W. E. Scharfman. Jun 65. 77p NASA-CR-75405
Contracts NAS1-3942, SRI PROJ. 5034

Descriptors: *Electron density, *Langmuir probe, *Plasma sheath, *Reentry vehicle, Collection, Continuum, Cylinder, Density, Electron, Electrostatic, Flow, Flush, Ion, Measurement, Plasma, Probe, Reentry, Sheath, Theory, Vehicle, Wedge.

For abstract, see S 04 15.

N66-27538 Field 20I
CFSTI Prices HC$1.00 MF$0.50
Yale Univ., New Haven, Conn. Dept. Of Engineering And Applied Science.
EXPERIMENTAL AND THEORETICAL RESEARCH ON PLASMA SHEATHS AND BOUNDARY LAYERS AROUND STAGNATION POINT ELECTRODES SEMIANNUAL PROGRESS REPORT NO. 3, 1 JUL. - 31 DEC. 1965.
by M. M. Chen. 23 May 66. 14p NASA-CR-75322
Grant NSG-724

Descriptors: *Boundary layer, *Electrode, *Plasma sheath, *Stagnation point, *Thermionic cathode, Boundary, Cathode, Conductance, Electric, Layer, Plasma, Point, Sheath, Stability, Stagnation, Theory, Thermionic.

For abstract, see S 04 15.

N66-27540 Field 20I
CFSTI Prices HC$2.00 MF$0.50
Yale Univ., New Haven, Conn. Dept. Of Engineering And Applied Science.
EXPERIMENTAL INVESTIGATION OF STAGNATION POINT ELECTRODES.
by M. Chen, and E. Zimet. 1966. 44p NASA-CR-75341
Grant NSG-724

Descriptors: *Electrode, *Plasma flow, *Stagnation point, Arc, Flow, Heating, Measurement, Plasma, Point, Spectroscopy, Stagnation, Stark effect, Surface, Temperature.

For abstract, see S 04 15.

N66-27543 Field 20I
CFSTI Prices HC$3.00 MF$0.50
Michigan Univ., Ann Arbor. Plasma Engineering Lab.
PLASMA MEASUREMENTS FROM 3 TO 120 KILOBARS OF PRESSURE FINAL REPORT.
by J. W. Robinson. May 66. 51p NASA-CR-75334
Grant NSG-415
Its Rept.-05742-8-f

Descriptors: *Plasma physics, *Pressure measurement, *Temperature measurement, Capacitor, Density, Discharge, Energy, Energy density, Explosion, Magnetic, Measurement, Physics, Pinch, Plasma, Pressure, Resistivity, Temperature, Water.

For abstract, see S 04 15.

N66-27745 Field 20I
CFSTI Prices HC$5.00 MF$1.25
North American Aviation, Inc., Downey, Calif. Flight Sciences Dept.
FLOW FIELD PREDICTION AND ANALYSIS STUDY FOR PROJECT RAM B3 FINAL REPORT.
by W. H. Ball, F. J. Lyon, and H. G. Webb Jr. 20 Aug 66. 196p NASA-CR-66106, SID-65-1113
Contract NAS1-4743

Descriptors: *Flow field, *Ram b launch vehicle, *Shock layer, Attenuation, Chemical Equilibrium, Field, Flow, Layer, Prediction, Property, Radio, Shock, Signal.

For abstract, see S 04 15.

N66-28024 Field 20I
CFSTI Prices HC$3.00 MF$0.75
National Bureau Of Standards, Washington, D.C.
DEVELOPMENT OF A STABLE ULTRAVIOLET SOURCE AND TECHNIQUES FOR ACCURATE RADIOMETRY ANNUAL SUMMARY REPORT, 1 JAN. - 31 DEC. 1965.
by D. E. Erminy, A. T. Hattenburg, H. J. Kostkowski, and C. R. Yokley. 1966. 98p NASA-CR-75552, NBS-9099
NASA ORDER R-117

Descriptors: *Plasma arc, *Radiometry, *Ultraviolet radiation, Arc, Chamber, Geometry, High pressure, Model, Optical, Plasma, Plate, Portability, Radiation, Source, Spectrum, Ultraviolet, Window.

For abstract, see S 04 15.

N66-28374 Field 20I
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
USE OF A PLASMA GUN FOR PRODUCING HIGH ELECTRON CURRENT PEAKS.
Ispol'zovaniye Plazmennoy Pushki Dlya Polucheniya Bol'shikh Pikovykh Znacheniy
by I. V. Kozhukhov, YU. V. Muratov, V. P. Rashevskiy, P. I. Ryltsev, and V. P. Sarantsev. Jun 66. 16p NASA-TT-F-10206
Transl. Into English From Pribory I Tekhn. Eksperim. (Ussr), No. 1, 1966 P 139-143

Descriptors: *Beam current, *Electron beam, *Plasma gun, Beam, Current, Design, Discharge, Electrode, Electron, Gun, High, Peak, Plasma, Voltage.

For abstract, see S 04 15.

N66-28485 Field 20I
CFSTI Prices HC$3.00 MF$0.75
Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
EVOLUTION OF A PLASMA PUFF IN A LONGITUDINAL MAGNETIC FIELD.
by S. J. Moss. Jan 66. 74p NASA-CR-75683, TG-806
Contract NOW-62-0604-C
Sponsored In Part By Nasa

Descriptors: *Magnetic field, *Pinch effect, *Plasma, Characteristics, Conical, Effect, Evolution, Field, Gun, Hydromagnetic, Longitudinal, Loop, Magnetic, Model, Pinch, Signal.

For abstract, see S 04 16.

N66-28807 Field 20I
CFSTI Prices HC$6.00 MF$1.25
Massachusetts Inst. Of Tech., Cambridge. Center For Space Research.
A NEW APPROACH TO THE KINETIC THEORY OF PLASMAS.

by C. J. Bartlett. Jun 66, 230p NASA-CR-75777, CSR-T-66-1
Grant NSG-496

Descriptors: *Correlation function, *Kinetic equation, *Liouville equation, *Plasma theory, Amplitude, Charge, Correlation, Coupling, Disturbance, Effect, Equation, Function, Integration, Kinetic, Linear, Operator, Particle, Plasma, Potential, Theory, Velocity, Wave.

For abstract, see S 04 16.

N66-29214 **Field 20I**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
EXPERIMENTAL AND THEORETICAL PERFORMANCE OF COAXIAL PLASMA GUNS.
by A. E. Johansen, and C. J. Michels. Jul 66, 34p NASA-TN-D-3469

Descriptors: *Capacitor, *Performance characteristics, *Plasma gun, Argon, Bank, Calorimetry, Characteristics, Circuit, Coaxial, Energy, Equation, Exhaust, Experiment, Gun, Instrumentation, Kinetic, Momentum, Performance, Plasma, Snowplow, Theoretical, Velocity, Voltage.

For abstract, see S 04 16.

N66-29297 **Field 20I**
CFSTI Prices HC$1.00 MF$0.50
California Univ., Los Angeles. Dept. Of Physics.
INTERACTION BETWEEN ION BEAMS AND PLASMAS.
by R. Rowberg, J. M. Sellen, and A. Y. Wong. Apr 66, 18p NASA-CR-75818, R-6
Contract NGR-05-007-066

Descriptors: *Acoustics, *Cesium ion, *Ion beam, *Thermal plasma, Amplitude, Azimuth, Beam, Cesium, Density, Frequency, Gun, Interaction, Ion, Oscillation, Plasma, Stability, Thermal.

For abstract, see S 04 16.

N66-29349 **Field 20I**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
ON THE INSTABILITY OF A NONUNIFORM RAREFIED PLASMA IN AN INTENSE MAGNETIC FIELD.
O Neustoychivosti Neodnorodnoy Razrezhennoy Plasmy V Sil'nom Magnitnom Pole
by L. I. Rudakov, and R. Z. Sagdeyev. Jul 61, 7p NASA-TT-F-8044
Transl. Into English From Dokl. Akad. Nauk Sssr (Moscow), V. 138, No. 3, 1961 P 581-583

Descriptors: *Magnetic field intensity, *Nonuniform plasma, *Plasma instability, *Rarefied plasma, Current, Electric, Equation, Field, Heating, Hydrodynamics, Instability, Intensity, Kinetic, Longitudinal, Magnetic, Nonuniform, Plasma, Rare.

For abstract, see S 04 16.

N66-29395 **Field 20I**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TWO-STREAM INSTABILITY IN GRAVITATING PLASMAS WITH MAGNETIC FIELD AND ROTATION.
by S. P. Talwar. Mar 65, 25p NASA-TM-X-55176, X-641-65-97

Descriptors: *Astrophysics, *Interstellar gas, *Magnetic field, *Plasma instability, Cloud, Collapse, Direction, Field, Gas, Gravitational, Instability, Interstellar, Magnetic, Plasma, Propagation, Rotation, Stream.

For abstract, see S 04 16.

N66-29426 **Field 20I**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
VOLUME AND SURFACE INSTABILITY IN SLIDING PLASMAS.
by S. P. Talwar. Feb 65, 33p NASA-TM-X-55177, X-641-65-65

Descriptors: *Collisionless plasma, *Plasma instability, *Surface property, Charge, Collision, Collisionless, Dispersion, Electron, Electrostatic, Emission, Equation, Field, Fluid, Frequency, Homogeneity, Hydromagnetic, Instability, Ion, Magnetic, Particle, Perturbation, Plasma, Property, Sliding, Surface, Tangent, Uniform, Velocity, Volume, Wave.

For abstract, see S 04 16.

N66-29435 **Field 20I**
CFSTI Prices HC$3.00 MF$0.75
Stanford Univ., Calif. Inst. For Plasma Research.
COMPUTER EXPERIMENTS IN PLASMA PHYSICS.
by O. Buneman, and D. A. Dunn. Jan 65, 61p NASA-CR-57710, SU-0254-2
Grant NSG-299-63

Descriptors: *Computer method, *Motion equation, *Particle motion, *Plasma physics, Beam, Charge, Computer, Dimensional, Diode, Electron, Equation, Flux, Gas, Instability, Interaction, Ionized, Method, Motion, Particle, Physics, Plasma, Position, Simultaneous, Stream, Two.

For abstract, see S 04 16.

N66-29436 **Field 20I**
CFSTI Prices HC$3.00 MF$0.50
Maryland Univ., College Park. Inst. For Fluid Dynamics And Applied
COLLECTIVE BREMSSTRAHLUNG EMISSION FROM PLASMAS CONTAINING ENERGETIC PARTICLE FLUXES.
by T. H. Dupree, and D. A. Tidman. Jan 65, 52p NASA-CR-60390, BN-384
Grant NSG-220-62

Descriptors: *Bremsstrahlung, *Particle flux, *Thermal plasma, Density, Electron, Emission, Energetic, Flux, Frequency, Homogeneity, Particle, Plasma, Radiation, Spectral, Thermal.

For abstract, see S 04 16.

N66-29469 **Field 20I**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SCALAR FORMULATION OF IDEAL CHARGED GAS FLOW.
by L. A. Schmid. Jun 65, 36p NASA-TM-X-56607, X-641-65-227
Submitted For Publication

Descriptors: *Charged particle, *Gas flow, *Ideal gas, Adiabat, Angular, Charge, Electron, Equation, Flow, Formulation, Gas, Ideal, Isentropy, Motion, Particle, Potential, Scalar, Velocity.

For abstract, see S 04 16.

N66-29506 **Field 20I**
CFSTI Prices HC$3.00 MF$0.50
Denver Research Inst., Colo.
ELECTROMAGNETIC WAVE CHARACTERISTICS OF A FULLY IONIZED GAS FINAL REPORT.
by J. L. Boone, and J. G. Hewitt Jr. Jun 66, 51p NASA-CR-75919, DRI-2337
Grant NSG-518

Descriptors: *Electromagnetic wave, *Ionized gas, *Magnetohydrodynamics, *Magnetoplasma, *Wave propagation, Cesium, Collisionless, Electromagnetic, Gas, Incidence, Interferometer, Ionization, Microwave, Propagation, Reflection, Transmission, Wave.

For abstract, see S 04 16.

N66-29525 **Field 20I**
CFSTI Prices HC$1.00 MF$0.50
Stevens Inst. Of Tech., Hoboken, N. J. Dept. Of Physics.
AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF TURBULENCE INSTABILITIES AT PLASMA-MAGNETIC FIELD INTERFACES SEMIANNUAL REPORT.
by W. H. Bostick. Apr 65, 17p NASA-CR-75870, SIT-P163/7/65/
Grant NSG-596

Descriptors: *Coaxial accelerator, *Magnetic field, *Magnetosphere, *Plasma instability, Accelerator, Coaxial, Dipole, Field, Flow, Fluid, Instability, Interface, Intrusion, Magnetic, Physics, Plasma.

For abstract, see S 04 16.

N66-29734 **Field 20I**
CFSTI Prices HC$2.00 MF$0.50
Texas Univ., Austin. Plasma Dynamics Research Lab.
EVALUATION OF FARADAY-SHIELDED STIX COILS FOR ION CYCLOTRON RESONANCE HEATING OF A PLASMA TECHNICAL REPORT NO. 3.
by N. B. Dodge, A. A. Dougal, and M. Kristiansen. 30 Apr 66, 49p NASA-CR-76019
Grant NSG-353

Descriptors: *Coil, *Cyclotron resonance, *Electric field, *Plasma heating, *Shielding, Circuit, Copper, Cyclotron, Cylinder, Electric, Faraday effect, Field, Heating, Ion, Parameter, Physics, Plasma, Resonance, Waveform.

For abstract, see S 04 16.

N66-29739 **Field 20I**
CFSTI Prices HC$3.00 MF$0.50
State Univ. Of Iowa, Iowa City. Dept. Of Physics And Astronomy.
THE STRUCTURE OF THE SOLAR PLASMA FLOW GENERATED BY SOLAR FLARES.
by S.-I. Akasofu, and S. Yoshida. Apr 66, 52p NASA-CR-76013
Grants NSG-201-62, NSG-233-62
Prepared Jointly With Alaska Univ. Its Rept.-66-16

Descriptors: *Geomagnetic storm, *Solar flare, *Solar plasma, Analysis, Configuration, Energy, Flare, Flux, Geomagnetic, Interplanetary, Jet, Plasma, Shock, Solar, Statistical, Storm, Wave, Wind.

For abstract, see S 04 16.

N66-29741 **Field 20I**
CFSTI Prices HC$5.00 MF$1.00
Princeton Univ., N. J. Dept. Of Aerospace And Mechanical Sciences.
DYNAMICS OF A PINCH DISCHARGE DRIVEN BY A HIGH CURRENT PULSE-FORMING NETWORK.
by N. A. Black. May 66, 163p NASA-CR-76014
Grant NSG-306-63
Its Rept.-778

Descriptors: *Discharge, *Electric network, *Pinch effect, *Pulse, *Snowplow, Accelerator, Capacitance, Dynamics, Effect, Electric, Gas, High current, High voltage, Inductance, Linear, Magnetic, Network, Pinch, Propagation, Waveform.

For abstract, see S 04 16.

N66-29868 **Field 20I**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
RADIATION FROM A SLOT ANTENNA IN A GROUND PLANE COVERED BY A WARM PLASMA LAYER.
by N. C. Wenger. Jul 66, 38p NASA-TN-D-3504

Descriptors: *Conducting medium, *Plasma layer, *Radiation field, *Slot antenna, Antenna, Electromagnetic, Energy, Field, Fourier transform, Layer, Plasma, Property, Radiation, Reentry, Slot, Transport, Warm, Wave.

For abstract, see S 04 16.

N66-35659 **Field 20I**
CFSTI Prices HC$2.50 MF$0.75
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
ESTIMATES OF NONEQUILIBRIUM IONIZATION PHENOMENA IN THE INVISCID APOLLO PLASMA SHEATH.
by J. W. Daiber, M. G. Dunn, J. A. Lordi, and R. E. Mates. Sep 66, 64p NASA-CR-596
Contract NAS5-3976

Descriptors: *Apollo project, *Nonequilibrium ionization, *Plasma sheath, *Reentry communication, Atmosphere, Carrier, Charge, Communication, Density, Electron, Flow, Ionization, Nonequilibrium, Particle, Plasma, Reaction, Reentry, Sheath, Spacecraft, Superorbital, Trajectory, Velocity.

For abstract, see S 04 21.

N66-35728 **Field 20I**
CFSTI Prices HC$1.00 MF$0.50
Maryland Univ., College Park. Center For Atmospheric And Space Physics.
A FIRST ORDER TECHNIQUE FOR THE MEASUREMENT OF VEHICLE POTENTIAL IN THE IONOSPHERE.
by R. T. Bettinger. Aug 65, 16p NASA-CR-68767, TR-497
Contract NGR-21-002-057
Presented At The Western Meeting Of The Am. Geophys. Union, Dallas, Sep. 1965

Descriptors: *Ionosphere, *Langmuir probe, *Measuring apparatus, Apparatus, Cylinder, Geophysics, Measuring, Physics, Plasma, Potential, Probe, Sweep, Variation, Vehicle, Voltage.

For abstract, see S 04 21.

N66-35788 **Field 20I**
CFSTI Prices HC$1.00 MF$0.50
Harvard Coll. Observatory, Cambridge, Mass. Shock Tube Spectroscopy Lab.
THE CALCULATION OF CHEMICAL AND IONIZATION EQUILIBRIUM IN A CONVENTIONAL SHOCK TUBE SCIENTIFIC REPORT NO. 12.
by J. C. Flagg, and J. C. Rich. Jul 66, 24p NASA-CR-77642
Grant NSG-438, Contract NONR-1866/48/

Descriptors: *Chemical equilibrium, *Plasma density, *Shock tunnel, *Thermodynamic equilibrium, Atom, Calculation, Chemical, Computer, Density, Electron, Equation, Equilibrium, Ion, Ionization, Iteration, Method, Molecule, Plasma, Program, Shock, Thermodynamic, Tube, Tunnel.

For abstract, see S 04 21.

N66-35789 **Field 20I**
CFSTI Prices HC$3.00 MF$0.75
Princeton Univ., N. J. Guggenheim Labs. For The Aerospace Propulsion
PULSED ELECTROMAGNETIC GAS ACCELERATION EIGHTH SEMIANNUAL PROGRESS REPORT, 1 JAN. - 30 JUN. 1966.
by R. G. Jahn, and W. F. Von jaskowsky. 1 Jul 66, 68p NASA-CR-77643
Grant NSG-306-63
Its Rept.-634g

Descriptors: *Electromagnetic field, *Gas discharge, *Plasma acceleration, Acceleration, Capacitor, Current, Density, Discharge, Electric, Electromagnetic, Electron, Exhaust, Field, Gas, Interferometer, Laser, Measurement, Microwave, Plasma, Pressure, Probe, Profile, Pulse, Sheet, Signature, Voltage.

For abstract, see S 04 21.

N66-35958 **Field 20I**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
PRODUCTION OF HIGH PLASMA VELOCITIES BY HEATING AND SELF-MAGNETIC ACCELERATION IN ELECTRIC ARCS.
Erzeugung Hoher Plasmageschwindigkeiten Durch Heizung Und Eigenmagnetische Beschleunigung In Lichtboegen
by TH. Peters, and K. Ragaller. Aug 66, 44p NASA-TT-F-10253
Transl. Into English Of Deut. Versuchsanstalt Fuer Luft- Und Raumfahrt Rept.- 372, Oct. 1964 P 1-41

Descriptors: *Electric arc, *Plasma acceleration, *Plasma jet, Acceleration, Arc, Chamber, Electric, Expansion, Heating, Jet, Magnetic, Nozzle, Plasma, Production, Velocity.

For abstract, see S 04 21.

N66-36073 **Field 20I**
CFSTI Prices HC$4.00 MF$1.00
Stanford Univ., Calif. Dept. Of Aeronautics And Astronautics.
A UNIFIED TREATMENT OF THE RELAXATION PHENOMENON IN RADIATING ARGON PLASMA FLOWS BEHIND INCIDENT AND BAD SHOCK WAVES.
by P. E. Oettinger. Jul 66, 123p NASA-CR-77861, SUDAAR-285
Contract NGR-05-020-091
Its Inst. For Plasma Res. Rept.-86

Descriptors: *Argon plasma, *Plasma flow, *Shock wave, Argon, Bow, Electronic, Flow, Heat, Incidence, Nonequilibrium, Plasma, Radiative, Relaxation, Shock, Wave.

For abstract, see S 04 21.

N66-36100 **Field 20I**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
PRIMARY AND AFTERGLOW EMISSION FROM SUPERCOOLED NITROGEN EXCITED BY FAST ELECTRONS.
by D. I. Sebacher. 1965, 18p NASA-TM-X-56985

Descriptors: *Afterglow, *Fast electron, *Light emission, *Nitrogen, Beam, Electron, Emission, Energetic, Energy, Excitation, Fast, Gas, Ground, Ion, Lifetime, Light, Molecule, Primary, State, Supercooling, Transfer.

For abstract, see S 04 21.

N66-36139 **Field 20I**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
VELOCITY OF A PLASMA JET.
Skorost' Plazmennoy Strui
by M. V. Volk-levanovich, and F. B. Yurevich. Sep 66, 13p NASA-TT-F-10291
Transl. Into English From Vestsi Akad. Navuk Belarusk. Ssr, Ser. Fiz.-tekh. Navuk (Minsk), No. 1, 1966 P 125-128

Descriptors: *Arc jet, *Electric arc, *Plasma jet, *Velocity measurement, Arc, Brightness, Electric, Flow, Fluctuation, Gas, High speed, Jet, Measurement, Photography, Plasma, Plasmatron, Velocity.

For abstract, see S 04 21.

AD-473 662 **See Field 20C**

AD-639 715 **See Field 9E**

AD-640 032 **See Field 20E**

AD-640 065 **See Field 9E**

AD-640 066 **See Field 9E**

AD-640 149 **See Field 20E**

AD-640 237 **See Field 20N**

AD-640 407 **See Field 3B**

AD-640 417 **See Field 9E**

AD-640 467 **See Field 20L**

LA-3553 **See Field 20H**

N66-27807 **See Field 20D**

PB-170 931 **See Field 7D**

PB-173 286 **See Field 20D**

UCRL-14931 **See Field 9B**

20J. QUANTUM THEORY

AD-639 651 **Field 20J, 12A**
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
PAULI ALGEBRA AND THE STRUCTURE OF LORENTZ GROUP,
by Laszlo Tisza, and Cynthia Kolb Whitney. 1966, 43p
Contract Nonr-3963 (24)
Supported in part by NSF.

Descriptors: (*Matrix algebra, *Groups (Mathematics)), Algebraic geometry, Complex numbers, Quantum mechanics, Relativity theory.

The set of two-by-two complex matrices, called the Pauli algebra, is developed systematically for a variety of applications. In addition to the usual concepts, the authors discuss matrices which are normal (as a generalization of unitary or Hermitian), introduce the concept of complex matrix axis, and provide a so-called polar decomposition for any nonsingular matrix. As a first application, they discuss the homogeneous restricted Lorentz group. The parametrization here advanced for unimodular two-by-two matrices provides directly the geometrical meaning of the Lorentz transformation induced by any such matrix. The discussion is exhaustive and includes matrices which induce the so-called exceptional Lorentz transformations. (Author)

AD-639 733 **Field 20J, 3A, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Lincoln Lab., Mass. Inst. of Tech., Lexington.
A COMPUTER SIGNAL PROCESSING APPROACH FOR THE SHAPIRO FOURTH TEST OF THE GENERAL THEORY OF RELATIVITY.
Technical note,
by Ernst Gehrels, and Leon G. Kraft. 2 Sep 66, 31p TN-1966-23
Contract AF 19 (658)-5167

Proj. AF-649L
ESD-TR-66-431

Descriptors: (*Relativity theory, Test methods), Radar reflections, Radio astronomy, Signal-to-noise ratio, Programming (Computers), Fourier analysis.

I. I. Shapiro has proposed a new test of the general theory of relativity. The test involves the measurement of a discrepancy (of about 30 km) in the measured range of Mercury or Venus as the direct path from the earth to the planet passes through the strong gravitational field of the sun. Such measurements are now made possible by means of modern high-power radars as the Haystack Experimental Facility. Still the signal-to-noise ratios available at superior conjunction preclude sufficiently accurate range measurements by the ranging techniques used to date in radar astronomy. The primary difficulties arise from the doppler spreading due to planetary rotation and range spreading due to the radar depth of a rough planet. R. Price suggested using measurements made of the planetary range-doppler profile for comparison in a two-dimensional cross correlation. He showed that such a procedure yields for the power levels available at Haystack, an overall ranging accuracy of better than 1.5 km (9 Msec in round trip travel time), as opposed to a value of 6 km obtainable with an optimum choice of transmitter pulse length and a matched filter receiver. The Fourier analyses required for obtaining a detailed range-doppler profile require a tremendous amount of computation time. This report describes a table look-up approach that effects a Fourier transform without the use of multiplication. A time saving of at least 10:1 is achieved over a straightforward Fourier analysis. It is thus possible to perform the Fourier analysis and other functions such as pulse compression analysis (also described in detail) in real time on the computer facilies available on site. (Author)

AD-639 776 **Field 20J, 20H**
Not available from CFSTI.
Queens Coll. of the City Univ. of New York, Flushing.
INCONSISTENCY OF NORDSTROM-TYPE THEORIES OF GRAVITATION WITH THE PRINCIPLE OF EQUIVALENCE.
Revised ed.,
by A. L. Harvey. 24 Feb 66, 5p
Revision of manuscript submitted 2 Nov 65. See also AD-438 883.
Availability: Published in Il Nuovo Cimento v43 (ser-10) p1121-5 1966.

Descriptors: (*Equations of motion, Particle trajectories), (*Gravity, Theory), Relativity theory, Spin.

Identifiers: Equivalence principle.

In a recently published paper, the writer reconstructed an unpublished argument due to Einstein showing the first Nordstrom theory of gravitation to be in violation of the principle of equivalence because a rotating object would fall with lesser acceleration than a nonrotating object in a static, homogeneous, gravitational field. It has been suggested that this effect is that found by Papapetrou in his study of the motion of spinning particles in the general theory of Einstein. It is shown here that the effect is (1) present in any theory of the Nordstrom type and (2) not dependent on rotation as such but on the essential dependence of acceleration in one direction on the velocity in the transverse direction. (Author)

AD-639 815 **Field 20J, 20H**
Not available from CFSTI.
Imperial Coll. of Science and Technology, London (England). Dept. of Physics.
BOOTSTRAP CONDITIONS IN FIELD THEORY,
by N. G. Deshpande. 3 Jan 66, 21p
Grant AF-EOAR-46-64
Proj. AF-9751
Task 975101
AFOSR-66-1877
Availability: Published in Il Nuovo Cimento ser10 v44 p147-65 Jul 1 1966.

Descriptors: (*Elementary particles, Field theory), S-matrix, Mesons, Nuclear spins, Vector analysis, Great Britain.

Identifiers: Bootstrap hypothesis.

Consideration is given to the behaviour of field theory in the limit of vanishing renormalization constants and it is shown quite generally the possibility that field theory admits solutions which are equivalent to the usual bootstrap solutions based on the N/D method. Recent work of Gerstein and Deshpande on spin-zero mesons is extended, and it is shown that a consistent application of Z3=0 and Z3 delta mu sq. =0 conditions lead to a bootstrap behaviour, and that these are necessary and sufficient conditions. The spinor field is further studied and it is found that if a further condition is imposed, the bootstrap behaviour again follows. It is also suggested that vector mesons may show a similar behaviour. In all three cases it is shown that the conditions imposed lead to zeros of the propagator and vertex poles. These vertex poles move to the elementary-particle mass in the limit, and replace it. This behaviour is suggested as the condition for field theory bootstrap, and the correspondence of this to the usual definition is given. (Author)

AD-639 816 **Field 20J, 20H**
Not available from CFSTI.
Imperial Coll. of Science and Technology, London (England). Dept. of Physics.
A DYNAMICAL INTERPRETATION OF SPURIONS IN U-12,
by R. J. Rivers. 9 Aug 65, 18p
Grant AF-EOAR-46-64
Proj. AF-9751
Task 975101
AFOSR-66-0806
Availability: Published in Il Nuovo Cimento ser10 v41 p313-28 Feb 1 1966.

Descriptors: (*Elementary particles, Groups (Mathematics)) Field theory, Vector analysis, Equations, Nuclear scattering, Great Britain.

Identifiers: Quarks, Spurions, Unitarity, Symmetry (Quantum mechanics).

The theory of U-12 is considered from a field-theoretic viewpoint in a four-dimensional space, using noninvariant propagators as a means of providing additional symmetry breaking. The three- and four-point functions are discussed with the aim of giving an interpretation to both the homogeneous and inhomogeneous U-12 theory. This gives an alternative way of interpreting the difficulties with unitarity. The way in which spurions arise is discussed, and compared with their phenomenological use in the case of mass splitting. A discussion of the unitarity equations for quark-quark scattering with momentum spurions shows some of the dangers inherent in considering scattering amplitudes as independent of one another, and shows that violation of unitarity is more than infinitesimal. (Author)

AD-639 817 **Field 20J, 20H**
Not available from CFSTI.
Imperial Coll. of Science and Technology, London (England). Dept. of Physics.
THE IRREDUCIBLE REPRESENTATIONS OF U (12),
by J. M. Charap, P. T. Matthews, and R. F. Streater. 14 Jun 65, 22p
Grant AF-EOAR-46-64
Proj. AF-9751
Task 975101
AFOSR-66-0819
Availability: Published in The Proceedings of the Royal Society A v290 p24-43 1966.

Descriptors: (*Elementary particles, Groups (Mathematics)), Field theory, S-matrix, Equations, Transformations, Operators (Mathematics), Vector analysis, Great Britain.

Identifiers: Space-time symmetry, Symmetry (Quantum mechanics), Unitarity.

The unitary irreducible representations of inhomogeneous U (12) are constructed and a group theoretic basis established for the generalized Bargmann-Wigner equations, introduced by Salam, Delbourgo and Strathdee. All the complications of the problem are concerned with the space-time transformations which require the generalization of the Poincare group to inhomogeneous U (4). The covariant specifications of the 'little group' in terms of the Pauli-Lubanski pseudovector is generalized to U (4), and then to U (12), to give expressions for the infinitesimal generators of the little group which are valid for any physical representation and in any frame of reference. (Author)

AD-639 818 **Field 20J, 20H**
Not available from CFSTI.
Imperial Coll. of Science and Technology, London (England). Dept. of Physics.
MASS SPLITTING AND UNITARITY,
by G. Fraser. 5 Nov 65, 6p
Grant AF-EOAR-46-64
Proj. AF-9751
Task 975101
AFOSR-66-1544
Availability: Published in Physics Letters v19 n6 p521-3 1 Dec 1965.

Descriptors: (*Elementary particles, Groups (Mathematics)), (*Annihilation reactions, Groups (Mathematics)), Baryons, Antiparticles, Protons, K mesons, Matrix algebra, Decay schemes, Great Britain.

Identifiers: Symmetry (Quantum mechanics), Unitarity.

Recently several authors have calculated ratios of amplitudes for various proton-antiproton annihilation modes at rest on the basis of a broken inhomogeneous U (12) symmetry scheme. Their calculations neglect mass splitting within the baryon octet. Although the mass-splitting between the observed particles is small, the splitting within the baryon octet is large. For stopped proton-antiproton reactions, this suppresses intermediate states composed of behaviour baryon-antibaryon pairs. This will have an effect on the observed process because of unitarity. This note presents a method for estimating these effects using the inverse reaction matrix formalism of Matthews and Salam. (Nu.Cim. v13 p381 1959).

AD-639 819 **Field 20J, 20H**
Not available from CFSTI.
Imperial Coll. of Science and Technology, London (England). Dept. of Physics.
MASSLESS PARTICLES AND THE GOLDSTONE THEOREM,
by G. S. Guralnik, and C. R. Hagen. 2 Jul 65, 34p
Grant AF-EOAR-46-64
Proj. AF-9751
Task 975101
AFOSR-66-1879
Availability: Published in Il Nuovo Cimento ser10 v43 p1-32 May 1 1966.

Descriptors: (*Elementary particles, *Field theory), Groups (Mathematics), Operators (Mathematics), Transformations, Nuclear spins, Wave functions, Great Britain.

Identifiers: Gauge theory, Goldstone's theorem, Massless particles, Symmetry (Quantum mechanics).

The general circumstances under which a symmetry breaking can occur in a relativistic field theory are considered in some detail. It is found that only such theories which are invariant with respect to

a class of constant gauge transformations on the canonical field variables will necessarily support a broken-symmetry condition. While theories of this type generally possess an associated Goldstone theorem based on the elements of the canonical group, the consequent massless particle is seen to emerge more immediately as a direct result of the canonical commutation relations and the local conservation law implied by this extended gauge invariance. It is further shown that in a theory which accidentally possesses zero-mass quanta as well as a conserved bilinear current operator, there are an infinite set of broken-symmetry solutions as a consequence of an asymptotic invariance under the constant gauge group. This result is equivalent to the converse of the usual Goldstone theorem and serves to emphasize in a dramatic way the unique correspondence between massless particles and broken symmetries. The equivalence thus demonstrated must cast considerable doubt on the consistency of any broken-symmetry theory in which a massless particle arises solely through the Goldstone theorem with no reference to the detailed dynamics of the system. (Author)

AD-639 822 **Field 20J, 20H**
Not available from CFSTI.
Imperial Coll. of Science and Technology, London (England). Dept. of Physics.
UNITARITY AND THE BOUND-STATE PROBLEM IN ALMOST LOCAL FIELD THEORY,
by M. Martinis. 10 May 65. 20p
Grant AF-EOAR-46-64
Proj. AF-9751
Task 975101
AFOSR-66-1544
Availability: Published in Il Nuovo Cimento ser10 v40 p132-49 Nov 1 1965.

Descriptors: (*Elementary particles, *Field theory), (*Elastic scattering, Field theory), S-matrix, Special functions (Mathematical), Vector analysis, Great Britain.

Identifiers: Bound particles, Unitarity.

The results of this study are divided into three Sections. The first one demonstrates the possibility of imposing the condition of almost locality on a 4-point matrix element. This is done in order to obtain certain restrictions on the functions appearing in the Haag expansion of an almost local field. Disregarding possible end-point singularities it is possible to show that in a certain finite energy region these functions satisfy equations similar to physical unitarity. Assuming that the F-functions appearing in the Haag expansion possess analytic properties it is possible to find a model (given in the second Section) which explicitly shows how the end-point singularity can be cancelled by the threshold behaviour if the energy region is restricted to the elastic region. In the last Section it is shown how the bound-state problem may be incorporated into the spirit of almost local field theory. The problem is analysed in the case of AB elastic scattering where B represents a two-particle bound state of A. (Author)

AD-639 824 **Field 20J, 20H**
Not available from CFSTI.
Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.
A MODEL FOR FINAL-STATE INTERACTIONS,
by M. O. Taha. 28 May 65. 19p
Grant AF-EOAR-79-63
Proj. AF-9751
Task 975101
AFOSR-66-1405
Availability: Published in Il Nuovo Cimento ser10 v42 p201-19 Mar 21 1966.

Descriptors: (*Decay schemes, Mathematical models), (*Elementary particles, Decay schemes), Nuclear reactions, Graphics, Wave functions, Integral equations, Great Britain.

Identifiers: K matrix.

A final-state interaction decay model, suggested by Landshoff and Olive, is investigated. It is found to give results somewhat similar to dispersion-theoretic treatments. S and P waves are considered, with only iterative solutions indicated. The neighbourhood of the threshold is discussed and the existence and uniqueness of solutions proved under stated conditions. (Author)

AD-639 825 **Field 20J, 20H**
Not available from CFSTI.
Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.
NOTE ON MASS SHELL CORRECTIONS IN CURRENT ALGEBRA CALCULATIONS,
by B. Renner. 23 Dec 65. 5p
Grant AF-EOAR-36-65
Proj. AF-9751
Task 975101
AFOSR-66-0803
Availability: Published in Physics Letters v20 n1 p72-4 Jan 15 1966.

Descriptors: (*Elementary particles, Groups (Mathematics)), (*K mesons, Nuclear scattering), (*Pions, Nuclear scattering), Algebras, Mathematical models, Meson reactions, Great Britain.

Identifiers: Massless particles, Symmetry (Quantum mechanics), Unitarity.

The uncertainties of mass shell corrections make it desirable to avoid them, especially in strangeness changing transitions, since zero mass K-mesons produce an uncertainty which is hard to estimate. In this note a prescription based on pole models is given working with mass shell quantities only and applied to rederive the Adler-Weisberger relation with the result $gA/gV = 1.16$. We also discuss information from the Kaon-pion system about the Cabibbo angle and extensions of the SU3 algebra. (Author)

AD-639 826 **Field 20J, 20H**
Not available from CFSTI.
Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.
ELECTROMAGNETIC INTERACTIONS IN U (12) SYMMETRY,
by B. Renner. 9 Sep 65. 13p
Grant AF-EOAR-36-65
Proj. AF-9751
Task 975101
AFOSR-66-1312
Availability: Published in Il Nuovo Cimento ser10 v42 p137-47 Mar 1 1966.

Descriptors: (*Elementary particles, Groups (Mathematics)), (*Baryons, Nuclear reactions), (*Mesons, Nuclear reactions), Nucleons, Magnetic properties, Vector analysis, Protons, Neutrons, Pions, Gamma rays, Decay schemes, Great Britain.

Identifiers: Electromagnetic interactions, Omega mesons, Rho mesons, Symmetry (Quantum mechanics).

A model is developed for electromagnetic interactions of baryons and mesons in U (12) symmetry along the lines which led Salam to the deduction of the nucleon magnetic moments. The main assumption is vector meson dominance. A modification of Salam's treatment allows to deduce the magnetic moment of the proton approximately equal to 1.7 and the magnetic moment of the neutron 1.8 nuclear magnetons, for the nucleon magnetic moments. Consistency of the model requires the existence of only one independent strong-interaction coupling constant and leads to a relation between baryon-baryon-meson and three-meson coupling constant, which is found valid up to a factor 1.2, tested at g (N,N,pi) and g (rio,pi, pi). As independent test the model allows the deduction of about 0.72 MeV partial decay width for omega to pi-zero plus gamma (expt. (0.9 plus or minus 0.2) MeV) and of 0.8.10 to the -16th power S for the lifetime of pi-zero to two gamma (expt. 1.05 plus or minus 0.2).10 to the -16th power S). (Author)

AD-639 880 **Field 20J, 3A, 12A**
Not available from CFSTI.
Center for Radiophysics and Space Research, Cornell Univ., Ithaca, N. Y.
EMBEDDING PROPERTIES OF GENERAL RELATIVISTIC MANIFOLDS,
by P. Szekeres. 10 Jan 66. 17p
Contract AF 49 (638)-1527
Proj. AF-9767
Task 976702
AFOSR-66-1868
Availability: Published in Il Nuovo Cimento ser10 v43 p1062-76 Jun 21 1966.

Descriptors: (*Relativity theory, *Algebraic topology), Algebra, Field theory, Radio astronomy.

Integrability conditions for embedding a Riemannian manifold in a pseudo-Euclidean space of higher dimensions are derived. They are used to show that essentially the only physically significant solutions of the Einstein field equations which can be embedded in five dimensions are the Friedmann universes. The relation between symmetry properties and embedding properties of a manifold is discussed, setting upper bounds to the embedding class in certain cases. (Author)

AD-639 886 **Field 20J, 20H**
Not available from CFSTI.
Yale Univ., New Haven, Conn. Dept. of Physics.
PROJECTION OPERATORS IN THE UNIFIED REACTION THEORY,
by Yukap Hahn. 27 Sep 65. 7p
Contract DA-30-069-ORD-2581, Grant AF-AFOSR-394-64
Proj. AF-9751
Task 975102
AFOSR-66-0815
Supported in part by Contracts Nonr-285 (49) and NsG-699. Prepared in cooperation with New York Univ., N. Y. Dept. of Physics.
Availability: Published in Physical Review v142 n3 p603-7 18 Feb 1966.

Descriptors: (*Nuclear reactions, Theory), Wave functions, Nuclear scattering, Operators (Mathematics), N-body problem, Matrix algebra.

A simple form of the projection operators applicable for general rearrangement and exchange processes with full recoil effect is constructed for the unified reaction theory of Feshbach. Channels of difference cluster configurations are not orthogonal and the overlap of their wave functions is important. Multidimensional generalization of the wave functions and corresponding wave equations takes this effect into account in a simple way without the complication of solving the integral equations with overlap kernals. Introduction of the projection operators makes it possible to reduce the multiparticle scattering problem in a natural way to that of multiclusters and the dispersive part which involves intermediate states of the compound system. The formalism is compared with the Faddeev equations for the case of the three-particle two-cluster reactions, and also with other theories. (Author)

AD-639 934 **Field 20J, 7D**
CFSTI Prices: HC$4.60 MF$0.50
Uppsala Univ. (Sweden). Quantum Chemistry Group.
SUPERPOSITION OF CONFIGURATIONS AND NATURAL SPIN ORBITALS. APPLICATIONS TO THE He PROBLEM.
Technical note.
by Harrison Shull, and Per-Olov Loewdin. 15 Jun 58. 42p TN-13
Contract AF 61 (514)-1200

Descriptors: (*Atomic orbitals, *Wave functions), (*Helium, Atomic orbitals), Nuclear spins, Electrons, Hartree-Fock approxima-

tion. Vector analysis, Atomic energy levels, Operators (Mathematics), Sweden.

The method of superposition of configurations is examined in its application to the helium atom in two cases: a 21 x 21 matrix including all configurations up to 6s2, and a 20 x 20 matrix with all configurations up to the 4-quantum level, including angular terms. An analysis of the results suggests that inner orbitals may be better represented by pure exponentials than by Hartree-Fock orbitals whenever additional correlational degrees of freedom are permitted. Expressed in approximate natural spin orbital form, the wave function is almost invariant to choice of basis set, provided that the latter is reasonably chosen. In particular, the necessity of including continuum terms along with the discrete hydrogen-like set is demonstrated. (Author)

AD-639 935 **Field 20J, 7D**
Not available from CFSTI.
Uppsala Univ. (Sweden). Quantum Chemistry Group.
GENERALIZATIONS OF THE HARTREE-FOCK SCHEME.
Technical note,
by Per-Olov Loedin. 20 Feb 58, 15p TN-7
Contract AF 61 (514)-1200
Availability: Published in Annales Academiae Regiae Scientiarum Upsaliensis v2 1958.

Descriptors: (*Hartree-Fock approximation, *Wave functions), (*Atomic orbitals, Hartree-Fock approximation), Electrons, Nuclear spins, Operators (Mathematics), Atomic energy levels, Sweden.

In the Hartree-Fock scheme for treating a many-electron system, the total wave function is approximated by a single Slater determinant. In the unrestricted Hartree-Fock scheme, one may use different orbitals for different spins, but the single determinant then usually ceases to represent a pure spin state. Such an orbital splitting may partly depend on differences in exchange effects, but it seems as if the simple Coulomb repulsion between the electrons would be of still greater importance, since it causes the electrons with opposite spins to avoid each other even in systems with balanced spins. Different orbitals for different spins are also used in the extended Hartree-Fock scheme, but the wave function is now approximated by the component of the basic determinant which has the total spin desired and which is easily selected by means of a projection operator. It is believed that this extended method will be of particular value in treating the correlation problem and in handling magnetic phenomena. (Author)

AD-639 952 **Field 20J, 9E**
CFSTI Prices: HC$1.00 MF$0.50
Brandeis Univ., Waltham, Mass. Dept. of Physics.
HARMONIC OSCILLATOR PHASE OPERATORS,
by Edward C. Lerner. Aug 66, 20p Scientific-1
Contract AF 19 (628)-5833
Proj. AF-4645
Task 464502
AFCRL-66-624

Descriptors: (*Harmonic generators, *Quantum mechanics), Operators (Mathematics), Hamiltonian, Asymptotic series, Functional analysis.

Recent work on the quantum mechanical definition of harmonic oscillator phase is reviewed briefly and then reconsidered from a somewhat more systematic and general viewpoint. Starting with the classical Poisson bracket relations between the oscillator Hamiltonian and the sine and cosine of the phase angle, the possibility of using other operators than those used heretofore is discussed. For a broad class of such operators the spectra are obtained without resort to non-normalizable 'eigenvectors.' The so-called 'coherent states' are minimum uncertainty product states for phase and number in all cases considered. (Author)

AD-639 972 **Field 20J, 20H**
Not available from CFSTI.
Institute of Theoretical Physics, Stanford Univ., Calif.
SU4 MASS FORMULA AND PARTICLE CLASSIFICATION SCHEMES,
by J.-P. Antoine, D. Speiser, and R. J. Oakes. 16 Jul 65, 14p
Contract AF 49 (638)-1389
Proj. AF-9751
Task 975101
AFOSR-66-1327
Prepared in cooperation with Louvain Univ. (Belgium).
Availability: Published in The Physical Review v141 n4 p1542-53 Jan 1966.

Descriptors: (*Elementary particles, Groups (Mathematics)), Classification, Algebras, Mathematical models, Nuclear spins, Graphics, Belgium.

Identifiers: Symmetry (Quantum mechanics).

The mathematical derivation of the general mass formula of SU4 is given. The derivation is preceded by a survey of the mathematical aspects of the group SU4 and its representations. The possible elementary-particle symmetry schemes based on the Lie algebra of SU4 most of which have already been proposed, are classified and systematically discussed. The extension of SU4 to SU8 by inclusion of ordinary spin is discussed and shown to rule out two of the three classes of models. Finally, a simple SU8 model is sketched. (Author)

AD-639 975 **Field 20J, 20H**
Not available from CFSTI.
Harvard Univ., Cambridge, Mass. Dept. of Physics.
ASYMPTOTIC FORM OF THE S MATRIX FOR LARGE ANGULAR MOMENTUM IN THE LEFT HALF-PLANE.
Revised ed.,
by Hung Cheng, and Tai Tsun Wu. 8 Dec 65, 7p
Contract AF 49 (638)-1380
Proj. AF-9751
Task 975101
AFOSR-66-1245
Prepared in cooperation with Gordon McKay Lab. of Applied Science, Harvard Univ., Cambridge, Mass. Revision of manuscript submitted 9 May 65.
Availability: Published in The Physical Review v144 n4 p1232-6 Apr 29 1966.

Descriptors: (*Momentum, *S-matrix), (*Elementary particles, Momentum), Potential theory, Wave functions, Equations.

Identifiers: Regge poles, Yukawa potentials.

Consideration is given to questions in complex angular momentum theory, involving the distribution of Regge poles in the left hand lambda plane, by evaluation of the S matrix of complex angular momentum, S (lambda,s).

AD-639 976 **Field 20J, 20H**
Not available from CFSTI.
Harvard Univ., Cambridge, Mass. Dept. of Physics.
FIELD THEORY OF MATTER. IV,
by Julian Schwinger. 5 Apr 65, 8p
Contract AF 49 (638)-1380
Proj. AF-9751
Task 975101
AFOSR-66-1315
See also AD-616 182.
Availability: Published in The Physical Review v140 n1B pB158-63 Oct 11 1965.

Descriptors: (*Elementary particles, *Field theory), (*Mesons, Field theory), Groups (Mathematics), Special functions (Mathematical), Fermions, Parity, Invariance.

Identifiers: Symmetry (Quantum mechanics).

The relativistic dynamics of 0- and 1- mesons in the idealization of U3 symmetry is derived from the hypothesis that a compact group of transformations on fundamental fields induces a predominantly local and linear transformation of the phenomenological fields that are associated with particles. The physical picture of phenomenological fields as highly localized functions of fundamental fields implies that the interaction term of the phenomenological Lagrange function can have symmetry properties, expressed by invariance under the compact transformation group, that have no significance for the remainder of the Lagrange function, which describes the propagation of the physical excitations. It is verified that the meson interaction term derived by considering fundamental fermion fields is invariant under the parity-conserving group U6 X U6. The implied connection between the RHO-pi-pi and omega-pi-pi coupling constants is well satisfied. There is a brief discussion of the dynamics of fermion-particle triplets, from which it is shown that the invariance of the similarly derived interaction term implies the mass degeneracy of the singlet and octuplet of 1-mesons, without relation to 0-masses. The triplets are also used to illustrate the derivation of gauge- and relativistically invariant electromagnetical properties. The mass degeneracy of the nine 1-mesons, and of nine 2 + mesons, can be inferred from the commutation properties of bilinear combinations of the fundamental field. (Author)

AD-639 984 **Field 20J, 20H**
Not available from CFSTI.
Palmer Physical Lab., Princeton Univ., N. J.
EQUAL-TIME COMMUTATORS AND K-MESON DECAYS,
by C. G. Callan, and S. B. Treiman. 8 Dec 65, 8p
Contract AF 49 (638)-1333
Proj. AF-9751
Task 975101
AFOSR-66-0826
Availability: Published in Physical Review Letters v16 n4 p153-7 Jan 1966.

Descriptors: (*K mesons, *Decay schemes), (*Meson reactions, Decay schemes), Leptons, Pions, Vector analysis.

The impressive, quantitative account given by Adler and Weisberger of axial-vector renormalization effects in Beta decay has stimulated a search for further tests of the underlying hypothesis: notably, the weak-interaction current algebra proposed by Gell-Mann and the notion of a partially conserved axial-vector current (PCAC). Some additional applications of these ideas to leptonic decays of K and pi mesons are reported. The implications of a certain speculative generalization of the Gell-Mann equal-time commutation relations are also briefly discussed.

AD-639 985 **Field 20J**
Not available from CFSTI.
Palmer Physical Lab., Princeton Univ., N. J.
INELASTIC N/D PROBLEMS AND CATILLEJO-DALITZDYSON CUTS,
by James B. Hartle, and C. Edward Jones. 7 Apr 65, 4p
Contract AF 49 (638)-1333
Proj. AF-9751
Task 975101
AFOSR-66-0827
Availability: Published in Physical Review Letters v14 n19 p801-3 May 10 1965.

Descriptors: (*Elementary particles, *S-matrix), Field theory, Functions, Algebraic topology.

AD-639 986 **Field 20J**
Not available from CFSTI.
Palmer Physical Lab., Princeton Univ., N. J.
ENERGY OF INFINITELY LONG, CYLINDRICALLY SYMMETRIC SYSTEMS IN GENERAL RELATIVITY.

Revised ed.,
by Kip S. Thorne. 7 Dec 64, 19p
Contract AF 49 (638)-1333
Proj. AF-9751
Task 975101
AFOSR-66-0813
Revision of manuscript submitted 30 Sep 64. Research supported in part by NSF.
Availability: Published in The Physical Review v138 n1B pB251-66 Apr 12 1965.

Descriptors: (*Relativity theory, *Energy), Potential theory, Cylindrical bodies, Electromagnetic fields, Gravity.

A definition of energy is proposed for systems invariant under rotations about, and translations along, a symmetry axis. This energy (which is called 'cylindrical energy' or 'C' energy) takes the form of a covariant vector Pi, which obeys the conservation law P (i), i=0. C energy is localizable and locally measurable: The component of Pi along the world line of an observer is the C-energy density he measures. Near the symmetry axis of a static system, where strong gravitational fields are absent, C-energy density reduces to proper mass density. C energy is propagated by Einstein-Rosen gravitational waves and by cylindrical electromagnetic waves. In vacuo and in the presence of electromagnetic fields the C energy on a spacelike hypersurface is minimezed when the system is static; and the difference between the 'potential' part and the 'kinetic' part is a Lagrangian for the Einstein-Maxwell field equations. C energy can be a powerful tool in the analysis of finite as well as infinite cylindrically symmetric systems. It is used to elucidate the nature of Einstein-Rosen gravitational radiation, and to suggest and support the conjecture of flux resistance to gravitational collapse: In any configuration of electromagnetic fields collapsing toward a singularity, each electric and magnetic-field line is either entirely ejected from the collapsing region or entirely swallowed by it as collapse proceeds; there can be no flux threading a collapsed region. (Author)

AD-640 152 **Field 20J, 20C**
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
CURRENT COMMUTATORS IN QUANTUM ELECTRODYNAMIC,
by Irwin Goldberg. 1965, 3p
Prepared in cooperation with Clarkson Coll. of Technology, Potsdam, N. Y.

Descriptors: (*Field theory, *Commutators), Operators (Mathematics), Distribution theory, Quantum mechanics.

AD-640 153 **Field 20J, 20C**
CFSTI Prices: HC$1.00 MF$0.50
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
CONSISTENCY OF CURRENT COMMUTATORS.
Revised ed.,
by Irwin Goldberg, and Egon Marx. 1965, 15p
Prepared in cooperation with Clarkson Coll. of Technology, Potsdam, N. Y.

Descriptors: (*Field theory, *Commutators), Quantum mechanics, Fermions, Operators (Mathematics).

An apparent paradox is presented that originates from current commutators in quantum electrodynamics, followed by its solution. In the two appendices the author discusses the presentation made of the same (or a closely related) paradox by Schwinger in 1959 and Johnson in 1961. The conclusion is that there is no need to modify the current commutators. (Author)

AD-640 388 **Field 20J, 7D**
CFSTI Prices: HC$1.60 MF$0.50
London Univ. (England). Computer Unit.
EIGENVALUES AND FUNCTIONS FOR A MODIFIED COULOMB POTENTIAL,
by R. A. Buckingham, M. J. M. Bernal, and B. M. Mills. 30 Sep 59, 19p Scientific-1
Contract AF 61 (052)-151

Descriptors: (*Atomic energy levels, *Wave functions), (*Electrons, Wave functions), Perturbation theory, Equations, Transformations, Great Britain.

Identifiers: Eigenvalues.

The Schrodinger equation for a single electron in the field of a point charge Z2e and of a charge Z1e distributed uniformly over a concentric sphere of radius R is solved numerically for various values of the parameters Alpha = Z1/Z2 and X = Z2R. The energy eigenvalues for the 2s, 2p, 3s, 3p, 3d states are tabulated for Alpha = -0.75 (0.25)1.0 and X = 0 (2)20. (Author)

AD-640 389 **Field 20J, 7D**
CFSTI Prices: HC$2.60 MF$0.50
London Univ. (England). Computer Unit.
EVALUATION OF MOLECULAR INTEGRALS BY THE METHOD OF BARNETT AND COULSON.
by M. J. M. Bernal, and B. M. Mills. 1 Aug 60, 21p Scientific-2
Contract AF 61 (052)-151

Descriptors: (*Molecular orbitals, *Integrals), Programming (Computers), Electrons, Molecular energy levels, Great Britain.

A brief account of the Barnett-Coulson method for the evaluation of molecular integrals is given. Programs for calculating some of the basic integrals occurring in the method, and their application to the evaluation of two-electron two-centre integrals, are described. (Author)

AD-640 400 **Field 20J, 20H**
Not available from CFSTI.
Institute for Advanced Study, Princeton, N. J.
UNITARITY BOUNDS OF THE SCATTERING AMPLITUDE AND THE DIFFRACTION PEAK,
by S. W. McDowell, and A. Martin. 15 Sep 64, 13p
Grant AF-AFOSR-42-64
Prepared in cooperation with Cento Brasileiro de Pesquisas Fisicas, Rio de Janeiro, Brazil and CERN, Geneva 23, Switzerland. Research supported in part by NSF.
Availability: Published in Notas de Fisica v11 n13 p237-46 1964.

Descriptors: (*Nuclear scattering, Quantum mechanics), Nuclear cross sections, Diffraction, Elastic scattering, Wave functions, Brazil, Switzerland.

Identifiers: Reggie poles, Unitarity bounds.

From unitarity alone a lower bound for the derivative of the absorptive part of the forward scattering amplitude with respect to the momentum transfer is obtained, in terms of the elastic and total cross sections. Comparison with high energy scattering experiments shows that the actual value of this derivative is rather close to the lower bound, which provides some information on the partial wave distribution. The result can also be used to obtain consistancy requirements on theoretical models. (Author)

N66-28825 **Field 20J**
CFSTI Prices HC$1.00 MF$0.50
DESIGN OF A GENERAL CORRELATION RELATIVITY THEORY.
Entwurf Einer Allgemeinen Korrelativitaets-Theorie
by J. F. Glueck, and M. J. Glueck. 1966, 16p
In German

Descriptors: *Microparticle, *Quantum mechanics, *Relativistic velocity, *Theoretical physics, Action, Correlation, Energy, Kinetic, Mass, Mechanics, Physics, Quantum, Relativity, Theory, Velocity.

For abstract, see S 04 16.

N66-35743 **Field 20J**
CFSTI Prices HC$1.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
CONSTRAINED VARIATION METHOD IN MOLECULAR QUANTUM MECHANICS. COMPARISON OF DIFFERENT APPROACHES.
by D. P. Chong, and Y. Rasiel. 26 Aug 65, 21p
NASA-CR-68757, WIS-TCI-119
Grant NSG-275-62

Descriptors: *Lithium hydride, *Quantum mechanics, *Variation method, Constraint, Dipole, Electric, Hydride, Lithium, Mechanics, Method, Molecular, Moment, Physics, Quantum, Variation.

For abstract, see S 04 21.

AD-639 777 **See Field 20B**

AD-639 821 **See Field 20H**

AD-639 973 **See Field 3A**

AD-640 520 **See Field 18B**

20K. SOLID MECHANICS

AD-423 446 **Field 20K, 19D**
CFSTI Prices: HC$6.00
Stanford Research Inst., Menlo Park, Calif.
STRESS PROPAGATION IN SOILS.
Pt. 3 (Final),
by L. Seaman, G. N. Bycroft, and H. W. Kriebel. May 63, 204p
Contract DA-49-146-XZ-018
Proj. SRI-PHU-2917
Task 13.037
DASA-1266-3
See also AD-609 555, and AD-410 406.

Descriptors: (*Soil mechanics, Stresses), (*Stresses, Propagation), Mathematical models, Sand, Analysis, Experimental data, Viscoelasticity, Theory, Pressure, Explosions, Blast, Piezoelectric gages, Accelerometers, Particles, Velocity, Measurement, Attenuation.

Stress wave propagation experiments in sand were performed with the intention of determining a mathematical model for sand. A combined approach of experiment and analysis was used. The models selected analysis were a linear locking model which exhibits a permanent set after a loading cycle, and the constant tan delta viscoelastic model. Analyses were made of the response of a one-dimensional medium of each material subjected to a theoretical pressure in the form of the overpressure from an aboveground explosion. In the experimental work a blast loading was applied to the top of a column of soil in a tube designed to allow only one-dimensional motion. The required conditions were met in the sand below the top 15 cm and in the center of the tube out to 5 cm from the tube wall. Piezoelectric stress gages and accelerometers embedded in the soil measured soil response. Accelerometer records gave a reliable record of particle velocity in the soil but the recorded stresses were not simply related to the stress in the soil. Further development will be needed for the stress gages. Measurements of soil behavior gave attenuations of acceleration and particle velocity, and an increase in wave velocity with depth for a step input of pressure. (Author)

AD-453 257 **Field 20K**
CFSTI Price: HC$1.10
Royal Aircraft Establishment, Farnborough (England).

DEFINITIONS OF THERMAL STRAIN, MECHANICAL STRAIN, TOTAL STRAIN ETC,
by R. J. Atkinson, and E. H. Mansfield. Aug 64, 6p Technical note TN-Structures 362

Descriptors: (*Strain (Mechanics), Dictionaries), Documentation, Temperature, Mechanics, Engineering, Stresses, Thermal stresses, Great Britain.

Recommendations are made for a standard nomenclature for thermal strain, mechanical strain, total strain, etc. (Author)

AD-468 199 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Columbia Univ., New York. Dept. of Civil Engineering and Engineering Mechanics.
EFFECTS OF STRAIN-GRADIENT ON STRESS-CONCENTRATION AT A CYLINDRICAL HOLE IN AN ELASTIC SOLID.
by Nachman N. Eshel. Jun 65, 45p Technical rept., TR-2
Contract Nonr-4259 (13)
Proj. NR-064-388

Descriptors: (*Strain (Mechanics), Rings), (*Elasticity, Theory), (*Stresses, Cylindrical bodies), Mathematical analysis, Equations.

The solution of the problem of a cylindrical hole in a field of simple tension is obtained in the linear theory of elasticity in which the potential energy-density depends on both the strain and the gradient of the strain. The stress-concentration factor at the surface of the cylindrical hole is found and it is compared with the analogous results obtained in couple-stress theory and in classical elasticity. (Author)

AD-468 569 **Field 20K, 11D**
CFSTI Prices: HC$17.90 MF$1.00
Rohm and Haas Co., Huntsville, Ala. Redstone Arsenal Research Div.
MATHEMATICAL STUDIES OF COMPOSITE MATERIALS II.
Special rept.
by Howard W. Wilson Jr, James L. Hill, and James G. Goree. 1 Jun 65, 183p S-50
Contract DA-01-021-ORD-11878 (Z)
Prepared in cooperation with Alabama Univ., University. See also AD-426 838.

Descriptors: (*Composite materials, Dynamics), (*Dynamics, Theory), Boundary value problems, Mathematical analysis, Stresses, Elasticity, Programming (Computers), Programming languages, Ellipsoids, Shear stresses.

Solutions are presented for several linear elastostatic boundary value problems pertaining to infinite bodies which contain holes or inclusions. The first two sections of the report consider planes which are loaded by normal stresses at infinity and contain a single perfectly smooth inclusion of circular or elliptic form. The third section is devoted to determination of stresses in an infinite plate having a doubly periodic rectangular array of holes which are either uniformly pressurized or contain rigid inclusions bonded to the plate. The principal stresses at infinity act in the directions of the rectangular grid and the holes are assumed to have symmetry axes in these directions. The final section of the report presents a solution for the axisymmetric stress field about two rigid spherical inclusions bonded to a surrounding infinite medium. The inclusions can be unequal in size and are arbitrarily spaced with two independent normal stress components specified at infinity. Numerical results were obtained for each problem studied. Programs written in FORTRAN II programming language are listed in appendices. (Author)

AD-469 932 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Columbia Univ., New York. Inst. for the Study of Fatigue and Reliability.
CONDITIONS FOR INTERACTION OF CYCLIC TORSION WITH AZIAL LOADS,
by Maria Ronay. Aug 65, 39p Technical rept. TR-25
Contract Nonr-266 (91)
Proj. NR-064-470

Descriptors: (*Metals, Torsion meters), Fatigue (Mechanics), Creep, Aluminum, Copper, Brass, Iron.

The continuum mechanical theory of second order strain accumulation and the theory of interaction of second order extension due to cyclic torsion and sustained tension is summarized. The predicted linear interaction of second order extension due to cyclic torsion and sustained tension is proved by experiments on superpure aluminum, copper, Armco iron and 70 30 brass. It has been found that the conditions for interaction between cyclic torsion and axial stress are that the torsion angle be larger than the fatigue limit (elastic limit) and the applied tensile stress be larger than the Bauschinger yield limit in tension produced by reversed cyclic torsion. (Author)

AD-639 771 **Field 20K**
Not available from CFSTI.
Graduate Aeronautical Labs., Calif. Inst. of Tech., Pasadena.
ON GRIFFITH'S THEORY OF FRACTURE,
by Jerold L. Swedlow. 1960, 8p GALCIT, Pub-619-a
Published in Unidentified Journal.

Descriptors: (*Fracture (Mechanics), Theory), Stresses, Loading (Mechanics), Functions, Brittleness.

Identifiers: Griffith's theory.

Based on the observation that the strength of the stress singularity in the vicinity of a sharp crack, i.e., the stress intensity factor, is independent of stresses applied parallel to the crack, it is sometimes supposed that Griffith's criterion is also independent of transverse loading. Because the strain energy density is a quadratic function of the superposed stress fields, more than one singular term will occur, and an energetic criterion such as Griffith's must reflect the biaxiality of loads. Computations support this statement and give detailed brittle fracture criteria for several combinations of in-plane loadings. (Author)

AD-639 903 **Field 20K**
Not available from CFSTI.
Mathematics Research Center, Univ. of Wisconsin, Madison.
ON CORSON'S UNIFIED VARIATIONAL PRINCIPLE,
by A. M. Arthurs. 9 May 66, 2p
Contract DA-11-022-ORD-2059, Grant NsG-275-62
Availability: Published in Il Nuovo Cimento ser10 v43 p1208-9 Jun 21 1966.

Descriptors: (*Calculus of variations, *Quantum mechanics), Dynamics, Field theory, Wave functions.

In a recent paper Corson proposed a new variational principle as the starting point for both classical and quantum dynamics. This principle, therefore, must lead to Lagrange's equations (or equivalents) in the classical case and to the Schrodinger equation in the quantum case. The conclusion seems to be that Corson's single postulate is not enough. To formulate quantum dynamics from classical action expressions one must postulate a relation involving, for example, the wave function, as Feynman did.

AD-639 912 **Field 20K, 13J**
CFSTI Prices: HC$1.00 MF$0.50
Naval Research Lab., Washington, D. C.
DETERMINATION OF FIXED BASE NATURAL FREQUENCIES OF DUAL FOUNDATION SHIPBOARD EQUIPMENTS BY SHAKE TESTS,
by L. P. Petak, and G. J. O'Hara. 23 Aug 66, 17p NRL-6451
Projs. SF-013-10-01-1790, RR-009-03-45-5757

Descriptors: (*Vibration, Test methods), Shipborne, Foundations (Structures), Resonance.

The report investigates the application of resonance testing to determine the fixed base natural frequencies of an in-place shipboard equipment-foundation system which is supported at two base points. Translation of the base points can cause the structure to rotate as it translates. A method was previously proposed which required the simultaneous use of two shakers capable of phase control and a range of force ratios at each driving frequency; this method would be quite difficult and expensive to apply in the field. A new technique is proposed herein which requires only one shaker to be applied at a time, thereby reducing the difficulties and restrictions considerably. An application of the technique to a theoretical system, and an analog simulation of a shake test utilizing the new method are presented. (Author)

AD-640 008 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Brown Univ., Providence, R. I. Div. of Applied Mathematics.
GENERALIZED CONTINUUM MECHANICS.
Technical rept.,
by Albert E. Green, and Ronald S. Rivlin. Aug 66, 26p TR-18, Nonr-562 (40)/18
Contract Nonr-562 (40)
Proj. NR-064-406

Descriptors: (*Continuum mechanics, Theory), Deformation, Thermodynamics, Invariance, Tensor analysis.

The deformation in a body is described by a number of generalized coordinate fields. To each of these correspond conjugate body and surface force fields. From the first and second laws of thermodynamics and invariance considerations the field equations of the theory are derived. Director, multipolar and multiple displacement theories arise as special cases. (Author)

AD-640 180 **Field 20K**
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Surface Lab.
SURFACE ENERGY EFFECTS IN SLIDING PHENOMENA.
Final rept., 1 Jul 63-30 Jun 66,
by Ernest Rabinowicz. 12 Sep 66, 96p
Contract DA-31-124-ARO (D)-143
Proj. DA-20010501B700, MIT-9889
AROD-4266.4

Descriptors: (*Friction, Surface properties), Particles, Solids, Films, Roughness, Energy, Lubrication, Wear resistance.

It has been proposed that surface energy manifests itself in a sliding system through a characteristic distance, equal to the size of wear particles for that system. This hypothesis was tested in systems in which other distance parameters were introduced, namely abrasive particles of varying sizes, solid films of varying thickness, and sliding surfaces of varying roughness. A minimum load was postulated below which low wear rates would prevail, and a numer of experiments were carried out to test this prediction. The effect of material compatibility on friction and wear were evaluated. The experimental results either agreed with the predictions of the surface energy model, or at any rate were not inconsistant with them. (Author)

AD-640 259 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
NONLINEAR ACOUSTIC OSCILLATIONS OF A CYLINDRICAL SHELL,

by A. S. Volmir, and I. G. Kildibekov. 25 Apr 66. 11p FTD-TT-65-1948
TT-66-62423
Unedited rough draft trans. of Akademiya Nauk Armyanskoi SSR, Erevan. Izvestiya. Seriya Fiziko-Matematicheskikh Nauk, v17 n3 p65-70 1964.

Descriptors: (*Structural shells, Oscillms.

The natural and acoustically forced nonlinear oscillations of cylindrical panels, having an 'ideal' form, and also with consideration of initial inaccuracies in form of the center surface are investigated. (Author)

AD-640 397 **Field 20K**
CFSTI Prices: HC$5.00 MF$1.00
Ship Structure Committee, Washington, D. C.
THE NOTCH IMPACT TEST - DEVELOPMENT AND CRITICISM,
by F. Fettweis. Apr 51. 169p
Contract NObs-31217
Proj. SR-96
TT-66-62456
Die Kerbschlagprobe. Entwicklung und Kritik. trans. of Archiv fuer das Eisenhuettenwesen (West Germany) v2 n8 p625-74 1929.

Descriptors: (*Notch toughness, *Impact tests), Bending, Deformation, Fracture (Mechanics), Steel, Loading (Mechanics), West Germany.

After an investigation of the differences between the notch impact and the tension tests drop hammers, bend machines and other auxiliary devices, their defects and calibration as well as measuring procedures were discussed. The processes attending deformation and fracture were thoroughly investigated with emphasis being laid on the fundamental significance of the appearance of two kinds of fracture in steel. The reasons prohibiting the application of the law of similarity to the notch impact test were explained. Then followed discussions about the influence of temperature and specimen geometry on the notch impact work, with consideration of the two possible forms of break. After noting the facts so far known about the load deflection diagram in the notch impact test, the influence of the material, the structure, the chemical composition, heat treatment, hot and cold working, aging and temper brittleness were briefly discussed. (Author)

AD-640 419 **Field 20K, 11F**
CFSTI Prices: HC$3.00 MF$0.75
Texas Univ., Austin. Engineering Mechanics Research Lab.
CRACK INITIATION IN FATIGUE OF METALS.
Final scientific rept.,
by M. A. Wilkov, and R. Shield. May 66. 61p
EMRL-RM-1012
Grant AF-AFOSR-560-65
Proj. AF-9782
Task 978202
AFOSR-66-0856

Descriptors: (*Metals, *Fracture (Mechanics)), Fatigue (Mechanics), Electron microscopy, Crystal lattice defects, Temperature.

The origin and progressive growth of the fatigue crack on the surface of single and polycrystalline face centered cubic metals subjected to cyclic deformation were observed with an electron microscope. Unique features of the investigation were the successive examination of a selected area on the surface of a specimen and the selection of crystal orientation so that the active slip system and the Burgers vectors of the contributing dislocations could be more accurately defined. Fatigue damage was observed to begin as a sequence of small cavities oriented on the slip traces, which increase in number and size, ultimately joining to form either a continuous microcrack or shallow surface intrusion. Variation of temperature (4.2K to 300K), stress amplitude, and number of active slip systems does not change the basic process of crack initiation, but only the rate and mode of cavity coalescence. A tentative explanation of the mechanism of fatigue is proposed based on this work and other previous investigations. (Author)

AD-640 465 **Field 20K, 11F, 11B, 11I K**
CFSTI Prices: HC$7.00 MF$1.75
Battelle Memorial Inst., Columbus, Ohio.
DAMPING CAPACITY OF MATERIALS,
by Robert E. Maringer. Jan 66. 391p
Contract DA-01-021-AMC-11706 (Z)
RSIC-508-Vol-1

Descriptors: (*Materials, Internal friction), (*Damping, Materials), Solids, Metals, Alloys, Polymers, Ceramic materials, Bibliographies, Plastics.

The report contains a brief introduction to the field of damping capacity in materials and an extensive, annotated bibliography. The introductory material presents the fundamentals of damping, general methods of measuring internal friction or damping capacity, and some representative damping properties. The bibliography contains over 2300 references to pertinent literature published from 1955 through 1965, and is cross-indexed by both author and subject. (Author)

AD-640 475 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
EFFECT OF AXIAL FORCES AND NORMAL PRESSURE ON FREE OSCILLATIONS OF CYLINDRICAL SHELLS,
by I. S. Rakhimov. 18 Apr 66. 13p FTD-TT-65-1035
TT-66-62459
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Mashinostroenie (USSR) n8 p42-8 1964.

Descriptors: (*Structural shells, Oscillation), (*Cylindrical bodies, Oscillation), Force (Mechanics), Pressure, Frequency, USSR.

A discussion is given of the effect of axial forces and normal pressure on natural oscillations of circular orthotropic cylindrical shells. In maximum transition to isotropic shells the results are in excellent conformity with the existing solutions and experimental data. The approach to determine natural frequencies of oscillations of loaded shells which may be used in various industrial branches and in structural practice was investigated. (Author)

AD-640 487 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
CERTAIN PROBLEMS OF ELASTIC-PLASTIC OSCILLATIONS OF RODS,
by A. I. Buravtsev. 29 Apr 66. 12p FTD-TT-65-1830
TT-66-62464
Unedited rough draft trans. of Leningrad Univ. Vestnik (USSR) v20 n1 Seriya Matematiki, Mekhaniki i Astronomii n1 p77-83 1965.

Descriptors: (*Rods, Mechanical waves), Oscillation, Elasticity, Plasticity, Propagation, Deformation, USSR, Mathematical analysis.

A problem of propagation of the elastic-plastic waves in shafts of finite length with different boundary conditions is discussed. The dependence of tension on deformation is expressed mathematically. The solution is given in the finite form. (Author)

N66-27036 **Field 20K**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
DYNAMICS OF VISCOELASTIC SHELLS AND PLATES.
Dinamika Uprugo-vyazkikh Obolochek I Plastin
by E. I. Grigolyuk. 20 Aug 61. 7p NASA-TT-F-8058
refs Transl. Into English From Dokl. Akad. Nauk Sssr (Moscow), V. 138, No. 6, 1961 P 1317-1320

Descriptors: *Cylindrical shell, *Differential equation, *Oscillating cylinder, *Viscoelastic cylinder, Cylinder, Deformation, Differential Equation, Homogeneity, Isotropic, Linear, Oscillation, Shell, Stress, U.s.s.r., Velocity, Viscoelasticity.

For abstract, see S 04 15.

N66-27059 **Field 20K**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Lewis Research Center, Cleveland, Ohio.
PROJECTILE-IMPACT-INDUCED FRACTURE OF LIQUID-FILLED, FILAMENT-REINFORCED PLASTIC OR ALUMINUM TANKS.
by F. S. Stepka. Jun 66. 22p NASA-TN-D-3456

Descriptors: *Fracture, *Impact damage, *Projectile penetration, *Storage tank, Alloy, Aluminum, Burst, Damage, Epoxy, Filament, Impact, Liquid, Nitrogen, Penetration, Plastic, Projectile, Sphere, Steel, Storage, Stress, Tank, Urethane, Wall.

For abstract, see S 04 15.

N66-27069 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
Minnesota Univ., Minneapolis.
ON INTERNAL FRACTURE OF SOLIDS.
by C. C. Hsiao, S. R. Moghe, G. C. Soong, and W. L. Yin. 1965. 46p NASA-CR-67650
Contract NGR-24-005-070
Presented At The Intern. Conf. Of Fracture, Sendai, Japan, Sep. 1965

Descriptors: *Crack propagation, *Fracture mechanics, *Internal stress, Crack, Formation, Fracture, Hydrostatic, Initiation, Internal, Mechanics, Pressure, Propagation, Pulse, Solid, Sphere, Stress, Tensile, Tension, Viscoelasticity.

For abstract, see S 04 15.

N66-27070 **Field 20K**
CFSTI Prices HC$1.00 MF$0.50
Minnesota Univ., Minneapolis.
ON DEFORMATION AND STRENGTH.
by C. C. Hsiao, and C. S. Ting. 1965. 11p NASA-CR-67877
Contract NGR-24-005-070
Presented At The Intern. Conf. On Fracture, Sendai, Japan, Sep. 1965

Descriptors: *Deformation, *Metallography, *Microscopy, Continuum, Dependence, Fracture, Logarithm, Medium, Modulus, Time.

For abstract, see S 04 15.

N66-27222 **Field 20K**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
INFLUENCE OF INTERNAL PRESSURE ON THE CRITICAL SHEAR STRESS FOR AN INFINITELY LONG CYLINDRICAL SHELL.
by L. A. Shapovalov. 1960. 6p NASA-TT-F-8470
Transl. Into English From Prikl. Mat. I Mekh. (Moscow), V. 20, No. 5, 1956 P 669-67

Descriptors: *Cylindrical shell, *Internal pressure, *Shearing stress, Critical, Cylinder, Equation, Influence, Internal, Load, Long, Pressure, Shear, Shell, Stress, Torsion.

For abstract, see S 04 15.

N66-27245 Field 20K
CFSTI Prices HC$4.00 MF$1.00
Washington Univ., Seattle. Dept. Of Aeronautics And Astronautics.
PHOTOTHERMOVISCOELASTICITY II STATUS REPORT, 1 OCT. 1965 - 1 APR. 1966.
1966.
by R. J. Bollard, and E. H. Dill. Apr 66, 124p NASA-CR-75321
rant NSG-401

Descriptors: *Photoviscoelasticity, *Stress analysis, *Thermoviscoelasticity, Analysis, Constitutive, Distribution, Elasticity, Equation, Linear, Nonlinear, Photomechanics, Plasticity, Polariscope, Stress, Viscoelasticity.

For abstract, see S 04 15.

N66-27310 Field 20K
CFSTI Prices HC$7.09 MF$2.00
Avco Corp., Lowell, Mass. Research And Technology Labs.
STUDY OF METEOROID IMPACT INTO ABLATIVE HEAT SHIELD MATERIALS FINAL REPORT.
by L. L. Lander, E. Langberg, R. R. Mc math, and R. F. Suitor. Apr 66, 409p NASA-CR-65375, AVSSD-0002-66-RR
Contract NAS9-3404

Descriptors: *Ablating material, *Apollo project, *Gemini project, *Heat shield, *Meteoroid hazard, Ablation, Aluminum, Delrin, Hazard, Heat, Honeycomb, Hypervelocity, Impact, Material, Meteoroid, Shield, Tile.

For abstract, see S 04 15.

N66-27503 Field 20K
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
BUCKLING AND STEADY FLUTTER OF HEAT-COMPRESSED PANELS IN A SUPERSONIC FLOW.
Vypuchivaniye I Ustanovivshiysya Flatter Termicheski Szhatykh Paneley, Nakhodyashchikhsya V Sverkhzvukovom Potoke
by V. V. Bolotin, and YU. N. Novichkov, May 66, 27p NASA-TT-F-10106
Transl. Into English From Inzh. Zh. (Ussr), V. 1, No. 2, 1961 P 82-96

Descriptors: *Flutter analysis, *Panel flutter, *Supersonic flow, *Thermal buckling, Amplitude, Analysis, Buckling, Elastic, Flow, Flutter, Nonlinear, Panel, Plate, Steady, Supersonic, Thermal.

For abstract, see S 04 15.

N66-27545 Field 20K
CFSTI Prices HC$1.00 MF$0.50
J.G. Engineering Research Associates, Baltimore, Md.
PREDICTION OF THE DYNAMIC ENVIRONMENT OF SPACECRAFT COMPONENTS. PART I- GENERAL CONCEPTS AND DESCRIPTION OF COMPUTER PROGRAMS TECHNICAL REPORT NO. 5.
by J. E. Greenspon. Dec 65, 25p NASA-CR-75493
Contract NAS5-9124

Descriptors: *Computer program, *Dynamic response, *Spacecraft motion, *Structural dynamics, Air, Analysis, Computer, Damping, Dynamic, Dynamics, Environment, Method, Motion, Path, Program, Response, Spacecraft, Statistical, Structural.

For abstract, see S 04 15.

N66-27740 Field 20K
CFSTI Prices HC$7.01 MF$2.00
Aerojet-general Corp., Azusa, Calif. Von Karman Center.
PARAMETRIC STUDY OF GLASS-FILAMENT-REINFORCED METAL PRESSURE VESSELS.
by J. W. Campbell, F. J. Darms, R. E. Landes, and E. E. Morris. Apr 66, 401p NASA-CR-54855
Contract NAS3-6292
Its Aerojet 3184

Descriptors: *Filament winding, *Glass, *Metal shell, *Pressure vessel, Bearing, Filament, Fluid, High pressure, Load, Metal, Pressure, Reinforced, Shell, Storage, Vessel, Winding.

For abstract, see S 04 15.

N66-28008 Field 20K
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EFFECT OF FACE-SHEET STIFFNESS ON BUCKLING OF CYLINDRICAL SHELLS OF SANDWICH CONSTRUCTION.
by R. E. Fulton, and N. P. Sykes. Jun 66, 14p NASA-TN-D-3454

Descriptors: *Cylindrical shell, *Sandwich construction, *Sheet metal, Buckling, Construction, Core, Cylinder, Face, Loading, Metal, Sandwich, Shear, Sheet, Shell, Stiffness.

For abstract, see S 04 15.

N66-28010 Field 20K
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
DIMPLE, SPALL, AND PERFORATION CHARACTERISTICS IN ALUMINUM, COLUMBIUM, AND STEEL PLATES UNDER HYPERVELOCITY IMPACT.
by N. Clough, S. Lieblein, and A. R. Mc millan. Jun 66, 21p NASA-TN-D-3468

Descriptors: *Hypervelocity impact, *Meteoroid hazard, *Spacecraft construction material, Aluminum, Columbium, Construction, Damage, Hazard, Hypervelocity, Impact, Material, Meteoroid, Perforation, Plate, Radiator, Spacecraft, Steel, Thickness.

For abstract, see S 04 15.

N66-28012 Field 20K
CFSTI Prices HC$4.00 MF$1.00
Iit Research Inst., Chicago, Ill.
STUDIES IN PRESTRESSED AND SEGMENTED BRITTLE STRUCTURES.
by R. L. Barnett, and P. C. Hermann. Jun 66, 137p NASA-CR-505
Contract NASR-65/04/

Descriptors: *Beam column, *Bending theory, *I-beam, *Mathematical model, Beam, Bending, Brittleness, Column, Computer, Cylinder, Load, Mathematics, Model, Nonlinear, Ogive, Physical, Physical property, Prestress, Program, Property, Segment, Shell, Stress, Theory.

For abstract, see S 04 15.

N66-28019 Field 20K
CFSTI Prices HC$4.00 MF$1.00
National Aeronautics And Space Administration.
CURRENT STATUS OF PLANE CRACK TOUGHNESS TESTING.
by W. F. Brown Jr, and J. E. Srawley. 1966, 138p NASA-TM-X-52209
Presented At The Am. Soc. For Testing And Mater., Atlantic City, 29 Jun. 1966

Descriptors: *Crack propagation, *Elastic strength, *Fracture mechanics, *Material testing, *Notched metal, Crack, Elastic, Fracture, Material, Mechanics, Metal, Notch, Propagation, Specimen, Strain, Strength, Stress, Testing.

For abstract, see S 04 15.

N66-28426 Field 20K
CFSTI Prices HC$2.00 MF$0.50
Lehigh Univ., Bethlehem, Pa.
STRESS INTENSITY FACTORS FOR AN INFINITE PLATE WITH RADIAL CRACKS EMANATING FROM AN INTERNAL HOLE AND SUBJECTED TO CYLINDRICAL BENDING PROGRESS REPORT.
by T. Rich, and R. Roberts. Apr 66, 35p NASA-CR-75699
Contracts NGR-39-007-011, NSF GK-344

Descriptors: *Bending, *Crack propagation, *Plate, *Stress, Crack, Cylinder, Factor, Hole, Intensity, Internal, Material, Method, Propagation, Radial, Shear, Sheet, Void.

For abstract, see S 04 16.

N66-29079 Field 20K
CFSTI Prices HC$4.00 MF$0.75
Bell Aerosystems Co., Buffalo, N. Y.
APOLLO LEM ADAPTER STRUCTURAL ANALYSIS FINAL REPORT, JAN. 1965 - APR. 1966.
by R. H. Gallagher, W. Luberacki, and J. Padlog. Apr 66, 114p NASA-CR-65404
Contract NAS9-3970
Its Rept.-2286-950001

Descriptors: *Adaptation, *Apollo spacecraft, *Deformation, *Lunar excursion module (lem), *Stress analysis, *Thermal effect, Analysis, Excursion, Loading, Lunar, Mechanical, Module, Stress, Structural, Thermal.

For abstract, see S 04 16.

N66-29085 Field 20K
CFSTI Prices HC$1.00 MF$0.50
Georgia Inst. Of Tech., Atlanta. School Of Engineering Mechanics.
THE AXISYMMETRIC RESPONSE OF A COMPLETE CYLINDRICAL SHELL TO SHOCK LOADS PROGRESS REPORT.
by W. Stadler, and J. T.-Wang. 1965, 23p NASA-CR-75815
Grant NSG-571

Descriptors: *Cylindrical shell, *Dynamic response, *Shock load, *Thin walled shell, Axisymmetry, Boundary, Cylinder, Dynamic, Finite, Length, Load, Problem, Response, Shell, Shock, Thin, Value, Wall.

For abstract, see S 04 16.

N66-29212 Field 20K
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
A THEORY FOR INFLATED THIN-WALL CYLINDRICAL BEAMS.
by W. B. Fichter. Jun 66, 21p NASA-TN-D-3466

Descriptors: *Cylinder, *Structural dynamics, *Thin wall, Beam, Dynamics, Equation, Equilibrium, Force, Inflatable, Linear, Load, Moment, Nonlinear, Structural, Thin, Wall.

For abstract, see S 04 16.

N66-29292 Field 20K
CFSTI Prices HC$4.00 MF$1.00
General Dynamics/convair, San Diego, Calif.
CENTAUR TANK CORROSION TESTS AND X-RAYS.
1 Aug 65, 147p NASA-CR-72000, GD/C-BNZ-65-032
Contract NAS3-3232

Descriptors: *Centaur launch vehicle, *Corrosion prevention, *Liquid propellant, *Metal corrosion, *Propellant tank, Chemical, Cleaning, Coating, Corrosion, Inhibitor, Launch vehicle, Liquid, Metal, Method, Prevention, Propellant, Protection, Tank.

For abstract, see S 04 16.

N66-29305 **Field 20K**
CFSTI Prices HC$1.00 MF$0.50
California Inst. Of Tech., Pasadena. Graduate Aeronautical Labs.
THE BUCKLING OF CYLINDRICAL SHELLS STATUS REPORT NO. 11.
May 66, 10p NASA-CR-75830
Grant NSG-18-59

Descriptors: *Buckling, *Compression loading, *Cylindrical shell, *Shell stability, Calibration, Compression, Conical, Cylinder, Displacement, Imperfection, Loading, Longitudinal, Pressure, Program, Shell, Stability, Statistical, Stiffness, Strain, Structure, University.

For abstract, see S 04 16.

N66-29334 **Field 20K**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
STABILITY OF AXIALLY SYMMETRIC DEFORMATIONS OF SPHERICAL SHELLS UNDER AXIALLY SYMMETRIC LOAD.
Ob Ustoychivosti Osesimmetricheskikh Deformatsiy Sfericheskikh Obolo Chek Pri Osesimmetricheskikh Nagruzheniyakh
by A. V. Pogorelov. Sep 63, 6p NASA-TT-F-8628, ST-SM-10050
Contract NAS5-2078
Center, Sep. 1963 6 P Ref Transl. Into English From Dokl. Akad. Nauk Sssr, Teoriya Uprugosti (Moscow), V. 151, No. 5, 11 Aug. 1963 P 1053-1055

Descriptors: *Axisymmetric deformation, *Loading, *Shell stability, Axisymmetry, Bulge, Circle, Concentration, Deformation, Force, Outer, Pressure, Shell, Spherical, Stability, U.s.s.r., Uniform.

For abstract, see S 04 16.

N66-29390 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
SOME STUDIES ON THE NONLINEAR DYNAMIC RESPONSE OF SHELL-TYPE STRUCTURES.
by D. A. Evensen, and R. E. Fulton. 1965, 35p NASA-TM-X-56843
Presented At The Intern. Conf. On Dyn. Stability Of Struct., Evanston, Ill., 18-20 Oct. 1965

Descriptors: *Conical shell, *Cylindrical shell, *Shell stability, *Spherical shell, *Thin walled shell, *Vibration, Buckling, Circular, Conical, Cylinder, Equation, Loading, Nonlinear, Pressure, Response, Revolution, Shallow, Shell, Spherical, Stability, Thin, Wall.

For abstract, see S 04 16.

N66-29403 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
A SUMMARY OF HINGELESS-ROTOR STRUCTURAL LOADS AND DYNAMICS RESEARCH.
by J. F. Ward. 1965, 40p NASA-TM-X-56726
Presented At Symp. On The Noise And Loading Actions On Helicopter V/stol Aircraft And Ground Effect Machines, Southampton Univ., England, 30 Aug. - 3 Sep. 1965

Descriptors: *Aerodynamic characteristics, *Helicopter rotor, *Rotor aerodynamics, Aerodynamics, Characteristics, Critical, Critical loading, Dynamics, Flight, Helicopter, Hingeless, Loading, Model, Rotor, Structural, Test, Tunnel, Wind.

For abstract, see S 04 16.

N66-29406 **Field 20K**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
THE DETERMINATION OF FREE VIBRATIONS OF LONGITUDINALLY-STIFFENED THIN-WALLED, CIRCULAR CYLINDRICAL SHELLS.
Eigenschwingungen Versteifter Kreiszylinderschalen
by F. Heinrichsbauer, and W. Schnell. Apr 64, 23p NASA-TT-F-8856
Transl. Into English From German

Descriptors: *Circular cylinder, *Cylindrical shell, *Free vibration, *Stiff structure, *Thin walled shell, Circular, Conversion, Cylinder, Differential, Equation, Free, Frequency, Longitudinal, Matrix, Natural, Orthotropism, Shell, Stiffness, Thin, Vibration, Wall.

For abstract, see S 04 16.

N66-29442 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
Northwestern Technological Inst., Evanston, Ill.
ON NONCONSERVATIVE STABILITY PROBLEMS OF ELASTIC SYSTEMS WITH SLIGHT DAMPING.
by G. Herrmann, and I. C. Jong. 1964, 35p NASA-CR-60703
Grant NSG-605

Descriptors: *Degree of freedom, *Loading, *Stability test, *Viscous damping, Damping, Degree, Elastic, Equilibrium, Freedom, Linear, Nonconservative, Stability, System, Test, Two, Viscous.

For abstract, see S 04 16.

N66-29452 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
VIBRATION OF SANDWICH PANELS IN A VACUUM.
by C. A. Powell Jr, and D. G. Stephens. 1965, 29p NASA-TM-X-56878
Presented At The 35th Shock And Vibration Symp., New Orleans, 25-28 Oct. 1965

Descriptors: *Honeycomb core, *Polyurethane foam, *Sandwich plate, *Vibration, Chamber, Coefficient, Conference, Core, Damping, Foam, Honeycomb, Panel, Plate, Polyurethane, Pressure, Sandwich, Vacuum.

For abstract, see S 04 16.

N66-29545 **Field 20K**
CFSTI Prices HC$3.00 MF$0.75
California Inst. Of Tech., Pasadena. Graduate Aeronautical Labs.
STABILITY OF CYLINDRICAL SHELLS UNDER AXISYMMETRIC MOVING LOADS.
by G. A. Hegemier. May 66, 83p NASA-CR-75893
Grant NSG-18

Descriptors: *Axial load, *Cylindrical shell, *Elastic shell, *Shell stability, *Thin walled shell, Axial, Axisymmetry, Constant, Cylinder, Difference, Elastic, Functional, Laplace transform, Load, Moving, Shell, Stability, Technique, Thin, Velocity, Wall.

For abstract, see S 04 16.

N66-29567 **Field 20K**
CFSTI Prices HC$1.00 MF$0.50
California Ins Of Tech., Pasadena. Firestone Flight Sciences Lab.
THE INFLUENCE OF THE TESTING MACHINE ON THE BUCKLING OF CYLINDRICAL SHELLS UNDER AXIAL COMPRESSION.
by C. D. Babcock Jr. May 66, 25p NASA-CR-75883
Grant NSG-18

Descriptors: *Axial compression, *Buckling, Cylindrical shell, Axial, Compression, Cylinder, Load, Machine, Mechanics, Shell, Stiffness, Structural, Testing.

For abstract, see S 04 16.

N66-29870 **Field 20K**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
THE DISPLACEMENTS IN AN ELASTIC HALF-SPACE DUE TO A MOVING CONCENTRATED NORMAL LOAD.
by D. L. Lansing. Jul 66, 65p NASA-TR-R-238

Descriptors: *Displacement, *Half-space, *Load factor, *Steady state, Depth, Elastic, Equation, Factor, Half, Load, Motion, Normal, Space, Speed, State, Steady, Surface, Uniform.

For abstract, see S 04 16.

N66-35657 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
Georgia Inst. Of Tech., Atlanta.
THE AXISYMMETRIC RESPONSE OF CYLINDRICAL AND HEMISPHERICAL SHELLS TO TIME-DEPENDENT LOADING.
by C.-W. Lin, W. Stadler, and J. T.-Wang. Sep 66, 35p NASA-CR-572
Grant NSG-571

Descriptors: *Bending theory, *Cylindrical shell, *Dynamic response, *Thin walled shell, Bending, Boundary, Calculation, Completeness, Cylinder, Dynamic, Equation, Finite, Frequency, Length, Response, Shellhory, Thin, Transcendental, Value, Wall.

For abstract, see S 04 21.

N66-35736 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
California Univ., Los Angeles. Dept. Of Engineering.
BENDING-STIFFNESS PROPERTIES OF A PRESTRESSED SEGMENTED CERAMIC PLATE.
by W. J. Knapp, R. B. Matthiesen, and G. Nikolaychik. Jun 65, 39p NASA-CR-68114
Grant NSG-427
Its Rept.-65-26

Descriptors: *Bending, *Ceramics, *Poisson ratio, Characteristics, Composite, Cylinder, Elastic, Flexure, Mechanics, Plate, Prestress, Stiffness, Structural, Twist.

For abstract, see S 04 21.

N66-35964 **Field 20K**
CFSTI Prices HC$3.75 MF$1.25
Bell Aerosystems Co., Buffalo, N. Y.
EFFECT OF LOCAL PRESSURE TRANSIENTS ON THE DEFORMATIONS AND STRESSES IN CYLINDRICAL DUCTS. VOLUME I - THEORY AND DESIGN CHARTS.
by J. Padlog, and H. Reismann. 26 Jun 66, 225p NASA-CR-77774
Contract NAS8-11215
Its Rept. 2286-950002, Vol. I

Descriptors: *Axisymmetric deformation, *Cylinder, *Dynamic response, *Propulsion system, *Transient pressure, Axisymmetry, Deformation, Duct, Dynamic, Effect, Pressure, Propulsion, Response, Solution, Stress, System, Transient.

For abstract, see S 04 21.

N66-35965 **Field 20K**
CFSTI Prices HC$2.50 MF$0.75
Bell Aerosystems Co., Buffalo, N. Y.
EFFECT OF LOCAL PRESSURE TRANSIENTS ON THE DEFORMATIONS AND STRESSES IN CYLINDRICAL DUCTS. VOLUME II - USER'S MANUAL FOR GENERAL PURPOSE PROGRAM.
by Y. M. Echenoz, W. Luberacki, J. Padlog, and H. Reismann. 26 Jun 66, 84p NASA-CR-77773
Contract NAS8-11215
Its Rept.- 2286-950002, Vol. Ii

Descriptors: *Computer program, *Cylinder, *Dynamic response, *Manual, *Transient pressure, Computer, Deformation, Digital, Duct, Dynamic, Pressure, Program, Ramp, Response, Sinusoid, Stress, Transient.

For abstract, see S 04 21.

N66-36046 **Field 20K**
CFSTI Prices HC$3.00 MF$0.75
Physics International Co., San Leandro, Calif.
STUDY OF TWO-DIMENSIONAL CALCULATION OF CRATERING.
by D. J. Andrews, R. Hofmann, D. E. Maxwell, and E. T. Trigg. 30 Jun 66, 90p NASA-CR-77768, PIFR-032
Contract NAS5-9202

Descriptors: *Cratering, *Euler-lagrange equation, *Hypervelocity impact, *Time dependency, Calculation, Code, Comet, Coupled, Danny boy project, Dependence, Dimensional, Equation, Hypervelocity, Impact, Nuclear, Problem, Simulation, Solution, Time, Trajectory, Two.

For abstract, see S 04 21.

N66-36094 **Field 20K**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
A MODIFIED-STRIP-ANALYSIS METHOD FOR PREDICTING WING FLUTTER AT SUBSONIC TO HYPERSONIC SPEEDS.
by E. C. Yates Jr. 1964, 22p NASA-TM-X-54830

Descriptors: *Aerodynamic force, *Flutter analysis, *Wing loading, Aerodynamic, Analysis, Flutter, Force, Hypersonic, Loading, Method, Prediction, Speed, Strip, Subsonic, Wing.

For abstract, see S 04 21.

N66-36111 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge.
ANALYSIS OF A SPHERICAL SHELL WITH A NON-AXISYMMETRIC BOUNDARY.
by Z. M. Elias, and P. K. Ho. Sep 66, 33p NASA-CR-567
Contract NGR-22-009-059

Descriptors: *Projective-differential geometry, *Spherical shell, *Stress function, Analysis, Application, Boundary, Circular, Condition, Coordinate, Formula, Function, Loading, Nonaxisymmetric, Shell, Solution, Spherical, Stereography, Stress.

For abstract, see S 04 21.

N66-36112 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge.
A DUAL FORMULATION OF THIN SHELL THEORY.
by Z. M. Elias. Sep 66, 32p NASA-CR-568
Contract NGR-22-009-059

Descriptors: *Differential equation, *Elastic shell, *Shell theory, *Stress function, *Thin walled shell, Coordinate, Differential, Elastic, Energy, Equation, Formula, Function, Program, Shell, Strain, Stress, Theory, Thin, University, Wall.

For abstract, see S 04 21.

N66-36117 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
Arizona State Univ., Tempe.
A GREEN'S FUNCTION APPROACH TO THE VIBRATION OF THIN SPHERICAL SHELL SEGMENTS.
by J. P. Avery. Sep 66, 37p NASA-CR-602
Contract NGR-03-001-013

Descriptors: *Green function, *Spherical shell, *Vibration, Approach, Boundary, Condition, Coordinate, Elasticity, Formula, Function, Geometry, Linear, Program, Segment, Shell, Solution, Spherical, Thin, University.

For abstract, see S 04 21.

N66-36123 **Field 20K**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPARISON OF EXPERIMENTAL AND THEORETICAL STRESSES AT A MISMATCH IN A CIRCUMFERENTIAL JOINT IN A CYLINDRICAL PRESSURE VESSEL.
by P. T. Bizon, and W. C. Morgan. Sep 66, 19p NASA-TN-D-3608
Contract 124-11-06-01-22

Descriptors: *Cylindrical tank, *Pressure vessel, *Stress distribution, Cylinder, Distribution, Elastic, Internal, Joint, Mismatch, Pressure, Stress, Tank, Thin, Vessel, Wall.

For abstract, see S 04 21.

N66-36124 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
ELASTIC STRESSES AT A MISMATCHED CIRCUMFERENTIAL JOINT IN A PRESSURIZED CYLINDER INCLUDING THICKNESS CHANGES AND MEREDIONAL LOAD COUPLING.
by P. T. Bizon. Sep 66, 47p NASA-TN-D-3609
Contract 124-11-06-01-22

Descriptors: *Joint, *Stress analysis, Analysis, Butt, Change, Circumference, Coupling, Cylinder, Elastic, Load, Meridional, Mismatch, Pressurization, Stress, Thickness.

For abstract, see S 04 21.

N66-36127 **Field 20K**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
PREDICTION OF THE INVERSION LOAD OF A CIRCULAR TUBE.
by L. R. Guist, and D. P. Marble. Sep 66, 21p NASA-TN-D-3622
Contract 124-08-04-02

Descriptors: *Circular tube, *Compression loading, *Inversion, *Plastic deformation, Absorption, Circular, Compression, Deformation, Energy, Loading, Plastic, Prediction, Strain, Stress, Tube.

For abstract, see S 04 21.

N66-36225 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
Bolt, Beranek, And Newman, Inc., Cambridge, Mass.
ENERGY DISSIPATION ASSOCIATED WITH GAS-PUMPING IN STRUCTURAL JOINTS.
by G. Maidanik. 17 May 66, 50p NASA-CR-77926
Contract NAS5-9694
Its Rept.-1374

Descriptors: *Energy dissipation, *Joint, Beam, Damping, Dissipation, Energy, Gas, Loss, Mechanics, Motion, Plate, Pressure, Pumping, Structural, Vibration, Viscosity.

For abstract, see S 04 21.

N66-36302 **Field 20K**
CFSTI Prices HC$2.50 MF$0.75
Lockheed Missiles And Space Co., Palo Alto, Calif. Research Labs.
A REVIEW OF ANALYTICAL METHODS USED TO DETERMINE THE MODAL CHARACTERISTICS OF CYLINDRICAL SHELLS.
by K. Forsberg. S 66, 71p NASA-CR-613
Presented At The 7th Intern. Aeron. Congr., Paris, 14-17 Jun. 1965

Descriptors: *Cylindrical shell, *Mode shape, *Thin walled shell, Arbitrary, Boundary, Calculation, Characteristic, Condition, Cylinder, Differential, Equation, Exactness, Homogeneity, Method, Mode, Motion, Shape, Shell, Solution, Thin, Wall.

For abstract, see S 04 21.

N66-36343 **Field 20K**
CFSTI Prices HC$2.50 MF$0.75
Astro Research Corp., Santa Barbara, Calif.
A CONTRIBUTION TO THE MICROMECHANICS OF COMPOSITE MATERIALS - STRESSES AND FAILURE MECHANISMS INDUCED BY INCLUSIONS.
by H. Schuerch. Sep 66, 68p NASA-CR-582
Contract NAS7-427

Descriptors: *Composite material, *Stress analysis, Analysis, Composite, Cylinder, Design, Failure, Field, Function, Inclusion, Material, Mechanics, Strength, Stress.

For abstract, see S 04 21.

N66-36369 **Field 20K**
CFSTI Prices HC$2.00 MF$0.50
General Electric Co., Philadelphia, Pa.
PEAK PRESSURES IN THICK TARGETS GENERATED BY REDUCED DENSITY PROJECTILES.
by J. F. Heyda, and T. D. Riney. Sep 66, 47p NASA-CR-609
Contract NAS3-4176

Descriptors: *Hypervelocity projectile, *Meteoroid hazard, *Pressure measurement, Component, Damage, Hazard, Hypervelocity, Impact, Measurement, Meteoroid, Peak, Pressure, Projectile, Spacecraft, Target.

For abstract, see S 04 21.

AD-426 904 **See Field 11I**

AD-476 684 **See Field 11F**

AD-639 665 **See Field 12A**

AD-639 666 **See Field 11F**

AD-639 711 **See Field 13M**

AD-639 769 **See Field 13M**

AD-640 007 **See Field 9A**

AD-640 174 **See Field 12A**

AD-640 287 **See Field 11F**

N66-28276 **See Field 1C**

PB-170 803 See Field 13J

PB-173 360 See Field 13M

20L. SOLID STATE PHYSICS

AD-443 869 Field 20L
CFSTI Price: HC$3.00
Ohio State Univ. Research Foundation, Columbus.
IMPURITY PROFILE IN THE OXIDE REGION.
Final rept., 1 Jan 61-29 Feb 64,
by M. O. Thurston, F. E. Battocletti, and G. M. Rodgers. 15 Apr 64, 73p Rept. no. 1233-F
Contract DA-36-039-87426
Proj. RF-1233
Continuation of Contract DA-36-039-sc-83874.

Descriptors: (*Semiconductors, *Oxides), (*Silicon, *Doping), Films, Diffusion, Phosphorus, Tracer studies, Impurities, Distribution, Programming (Computers), Surface properties, Oxidation, Solid solutions.

The diffusion of impurities into silicon through an oxide layer was analyzed theoretically to include the effects of oxide growth during diffusion. The problem was reduced to computer programs. Experimental studies of the diffusion of phosphorus by radioactive tracer methods showed that the diffusivity of phosphorus in the oxide is concentration-dependent for concentrations above 10 to the 20th power cc. It was also found that impurity distributions near the surface of the oxide may be considerably changed by water and acid treatments. (Author)

AD-639 650 Field 20L, 20C
CFSTI Prices: HC$1.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge.
THE ROLE OF SURFACE TREATMENT IN THE FIELD EFFECT ANOMALY OF N-TYPE InSb AT HIGH MAGNETIC FIELDS.
Technical rept.,
by Shinji Kawaji, and Harry C. Gatos. Aug 66, 14p TR-6
Contract Nonr-3963 (05)
Proj. NR-032-482

Descriptors: (*Semiconductors, Surface properties), (*Indium alloys, *Antimony alloys), Magnetic fields, Carriers (Semiconductors), Anomalies, Symmetry (Crystallography), Cryogenics, Electrons, Kinetic energy.

Identifiers: Indium antimonide, Field effect.

By applying a magnetic field perpendicular to the surface of n-type InSb during a classical field effect experiment, a decrease in surface conductance was observed as contrasted to the expected field effect increase in conductance. This anomaly in the field effect was found in the case of cleaved 110 as well as etched 111 surfaces at 77K both in vacuum or immersed in liquid nitrogen. In the case of the 110 surfaces the anomaly was also observed at 4.2K in vacuum but not when they were immersed in liquid helium. The anomaly was not present at 4.2K in the case of 111 surfaces either in vacuum or when they were immersed in liquid helium. The results are explained on the basis of cross quantization of the kinetic energy of the electrons by the narrow surface space charge potential barrier normal to the surface and the magnetic orbital quantization on a plane parallel to the surface. (The symbol $ is used here to indicate brackets). (Author)

AD-639 729 Field 20L
Not available from CFSTI.
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
ANNEALING OF RADIATION DAMAGE IN ZnSe.
Revised ed.,
by Robert M. Detweiler, and B. A. Kulp. 10 Jan 66, 6p ARL-66-0166
Proj. 7885
Revision of manuscript submitted 17 May 65.
Availability: Published in Physical Review v146 n2 p513-6 Jun 10 1966.

Descriptors: (*Zinc compounds, *Selenides), (*Semiconductors, *Radiation damage), (*Crystal lattice defects, *Annealing), Fluorescence, Band spectrum, Cryogenics, Carriers (Semiconductors), Electron bombardment.

Identifiers: Zinc selenide.

Electron bombardment of ZnSe at 80K results in the production of two fluorescence bands at 5460 and 5850A. The threshold for damage at 80K is 240 keV. When the sample is cooled to 4.2K following bombardment at 80K the fluorescence spectrum changes, reflecting the temperature dependence of the fluorescence; the peak at 5460A disappears, a new one at 6400A appears, and the peak at 5850A shifts slightly to a shorter wavelength. When the crystals are bombarded at 10K, fluorescent peaks at 6100A and 6400A are produced. The threshold for radiation damage at 10K is 195 keV. The radiation damage at high energies at 10K anneals in three stages, one at about 60K, another at 90K, and the final one at 135K. The fluorescence spectrum changes following each of the first two annealing stages and disappears completely after the third annealing stage. With equal bombardment times, the fluorescence spectrum at 10 and 80K is identical, whether the crystal has been bombarded at 10K and annealed at 90K, or bombarded at 80K without annealing. A Meecham and Brinkman plot was used to determine the activation energies and the order of reaction of the three annealing stages. (Author)

AD-639 842 Field 20L
Not available from CFSTI.
Milan Univ. (Italy). Istituto di Fisica.
ISOTOPE EFFECTS INDUCED BY LOCAL MODES IN THE U BAND,
by E. Mulazzi, N. Terzi, and G. Baldini. 22 Jul 65, 10p
Grant AF-EOAR-05-65
Proj. AF-9761
Task 976101
AFOSR-66-1777
Prepared in cooperation with Rochester Univ., N. Y. Inst. of Optics.
Availability: Published in Physical Review v140 n6A pA2094-2101 13 Dec 1965.

Descriptors: (*Crystal lattice defects, Band spectrum), (*Ultraviolet spectroscopy, Crystal lattice defects), Potassium compounds, Rubidium compounds, Chlorides, Bromides, Impurities, Hydrogen, Deuterium, Color centers, Italy.

Identifiers: Potassium bromide, Potassium chloride, Rubidium chloride.

The experimental investigation in the temperature range from 4 to 400K of the ultraviolet U band in KCl, KBr, and RbCl crystals containing H (-) and D (-) ions has revealed the following isotope effects: (a) The half-width of the UH band is from 4 to 8% larger than that of the UD band. (b) The UH band occurs at energies approx. 0.02 eV smaller than those of the UD band. In order to describe these results the method of moments, in the harmonic and Condon approximations, was applied. From the symmetry of the defect it is shown that only the vibrational modes which transform according to the Gamma 15 (-) representation of the full cubic point group can be responsible for the isotope effects; these modes are just those active in the infrared. It is found that during optical transitions, allowed in depole approximation, the Gamma 15 (-) modes suffer, via the electron-phonon interaction, only a frequency shift, and that only the local mode has to be taken into account in order to predict the observed isotope effects, since the contribution coming from the Gamma 15 (-) continuum is negligible. Finally, the local-mode frequency of the excited U center was estimated. (Author)

AD-639 874 Field 20L, 20M
Not available from CFSTI.
Westinghouse Research Labs., Pittsburgh, Pa.
THERMAL CONDUCTIVITY OF TIN TELLURIDE BETWEEN 100 AND 500 DEGREES KELVIN,
by D. H. Damon. 15 Feb 66, 12p
Contract AF 49 (638)-1165
Proj. AF-9763
Task 976302
AFOSR-66-1864
Availability: Published in Journal of Applied Physics v37 n8 p3181-90 Jul 1966.

Descriptors: (*Semiconductors, Thermal conductivity), (*Tin alloys, Tellurium alloys), Electrical conductance, Seebeck effect, Carriers (Semiconductors).

Identifiers: Tin telluride.

The thermal conductivity, electrical conductivity, and Seebeck coefficient of several specimens of SnTe was measured between 100 and 500K. The thermal conductivity is weakly dependent on both temperature and hole concentration. The total thermal conductivity is separated into an electronic and a lattice thermal conductivity. Because of the large concentrations of Sn vacancies in the samples, the phonons are scattered both by three-phonon umklapp processes and by the Sn vacancies; this results in a lattice thermal conductivity that varies with temperature more like T to the minus 1/2 power rather than T to the minus 1. The Lorenz number relating the electrical conductivity and the electronic thermal conductivity is an unusual function of hole concentration. The Lorenz number is larger than the Sommerfeld value L sub o, varies with hole concentration p, and has a maximum value of about 1.3 L sub o at p = 2 x 10 to the 20th power/cu cm. This is consistent with the variation of the electrical conductivity and the Seebeck coefficient with hole concentration. (Author)

AD-639 904 Field 20L, 8K, 20C, 20B K
Not available from CFSTI.
Poulter Labs., Stanford Research Inst., Menlo Park, Calif.
HIGH-PRESSURE ELECTRICAL BEHAVIOR AND EQUATION OF STATE OF MAGNESIUM OXIDE FROM SHOCK WAVE MEASUREMENTS,
by Thomas J. Ahrens. 1 Dec 65, 11p
Contract DA-04-200-ORD-1279
Availability: Published in Journal of Applied Physics v37 n7 p2532-41 Jun 1966.

Descriptors: (*Magnesium compounds, Electrical properties), (*Oxides, Electrical properties), Single crystals, Shock waves, Diffusion.

Identifiers: Magnesium oxides.

A decrease in resistivity of MgO from >100,000 to approx .1000 ohms cm is observed when thin single crystals are shocked in the 001 direction to 920 plus or minus 70 kbar. This effect may be produced by several electronic processes, or by ionic transport in which the effective O (=) or Mg (++) diffusion constants are increased by perhaps a factor of 10 to the 39th power from those calculated at high pressure (according to Zener strain-energy model). Voltages are observed during passage of various-strength (70 to 936 kbar) shock fronts through the specimen. These voltages approximately scale as the inverse of the specimen thickness and may arise from net volume polarization (approx 0.2 to approx 9 V/cm). Some Hugoniot data to 660 kbar (including measurement of elastic-shock amplitude varying from 35 to 89 kbar) are presented. (Author)

AD-639 905 Field 20L
Not available from CFSTI.
Poulter Labs., Stanford Research Inst., Menlo Park, Calif.
SHOCK-INDUCED ELECTRICAL POLARIZATION OF ALKALI HALIDES,
by Ronald K. Linde, William J. Murri, and Donald

G. Doran. 9 Aug 65, 7p
Contract DA-04-200-ORD-1279
Availability: Published in Journal of Applied Physics v37 n7 p2527-32 Jun 1966.

Descriptors: (*Alkali metal compounds, *Electric moments), (*Polarization, Alkali metal compounds), Shock waves, Crystals, Halides.

Electrical signals attributed to polarization of NaCl, KI, KCl, and CsI crystals shocked in the 10- to 40- kbar and 90- to 220- kbar ranges are described. The signals observed cannot be explained by the simplified models found in the literature, nor has correlation been established between the magnitude or polarity of the polarization signal and the crystal structure of the cation-to-anion mass ratio. There is some correlation with shock pressure for NaCl below 40 kbar. The signal shape is significantly different for shock compression along different crystallographic directions. (Author)

AD-639 967 **Field 20L, 11F, 11G**
CFSTI Prices: HC$4.00 MF$0.75
Chicago Univ., Ill.
TOPICS IN THE THEORY OF MAGNETIC METALS,
by M. H. Cohen. 1966, 126p
Contract Nonr-2121 (22), Grant NsG-352
Lectures presented at the International School of Physics 'Enrico Fermi' Course 37, on Theory of Magnetism in Transition Metals, Jun 6-25, 1966.

Descriptors: (*Magnetic materials, Theory), (*Transition elements, Theory), Statistical mechanics, Superconductivity, Alkali metals, Antiferromagnetism.

This series of lectures covers the following five topics in the theory of magnetic metals. (1) Generalization of the Landau quasi-particle theory to include dynamical interactions and large changes of state. (2) Penn's theory of the stability of magnetic phases for a simple model of the transition metals is reviewed. (3) Antiferromagnetic in simple metals is discussed. (4) The distribution of magnetism and superconductivity in the periodic table is treated qualitatively. (5) The electronic configuration of the alkali metals is discussed in relation to their optical properties, phase diagrams and the possibility of magnetism. (Author)

AD-640 171 **Field 20L, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Oregon State Univ., Corvallis. Dept. of Chemistry.
THE OSCILLATOR STRENGTH OF LEAD (II) ION IN POTASSIUM CHLORIDE SINGLE CRYSTALS.
Technical rept.,
by Robert E. Holmes, and Allen B. Scott. 25 Aug 66, 36p TR-9
Contract Nonr-1286 (05)
Proj. NR-018-701

Descriptors: (*Color centers, Lead), (*Lead, Absorption spectrum), (*Potassium compounds, Chlorides), Single crystals, Doping, Impurities, Magnetic fields, Crystal growth, Band spectrum, Chemical analysis.

Identifiers: Potassium chloride.

KCl single crystals, homogeneously doped with PbCl2, were analyzed for lead by the dithizone method, and the optical absorbance at 273 millimicrons was determined. The absorbance at 273 millimicrons in samples of a given lead concentration depended on original purity of the KCl, the atmosphere under which the crystal was grown, and the thermal treatment prior to measurement. The oscillator strength was found to be 0.11 plus or minus 0.02 in crystals of highest purity, grown under dry HCl or argon, and rapidly quenched from 600C. This agrees with the value reported by Sibley, Sonder, and Butler. When reagent grade KCl was used, or the atmosphere was air, the average oscillator strength found was 0.086, which is close to the value reported by Kaifu. (Author)

AD-640 186 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
Harvard Univ., Cambridge, Mass. Div. of Engineering and Applied Physics.
CALCULATION OF UPPER BOUNDS TO THE SMALL-ANGLE SCATTERING FROM CRYSTALLITE MODELS OF AMORPHOUS MATERIALS.
Technical rept.,
by Arthur Bienenstock, and Brian G. Bagley. Jul 66, 39p TR-7
Contracts Nonr-1866 (50), SD-88
Proj. NR-032-485

Descriptors: (*X rays, Scattering), (*Glass, X rays), (*Silicon compounds, Dioxides), Models (Simulations), Molecular association, Gels, X-ray diffraction analysis, Intensity.

Identifiers: Silicon dioxide.

The ability of experimentalists to observe small-angle x-ray scattering from single phase liquids and amorphous solids has been considered, by many workers in the field, to invalidate a crystallite model for these materials. In this work calculation is made of the intensity of small-angle x-ray scattering from two crystallite models which are designed to yield upper bounds to the actual scattering. The calculated upper bounds are, in general, considerably lower in intensity than the scattering from isolated particles. The results are extremely sensitive to the density and average crystallite size of the sample, so that general conclusions about the observability of such scattering cannot be made. The particular case of vitreous SiO2, which was examined experimentally by B. E. Warren and D. L. Weinberg was studied in detail. For this case, the calculated scattering intensity is of the same order of magnitude as that observed by these authors. Thus, it is concluded that the failure to observe small-angle scattering from vitreous SiO2 does not invalidate a crystallite model for that material. It should be noted that the calculation does not, on the other hand, offer any evidence for the existence of crystallites. (Author)

AD-640 214 **Field 20L**
CFSTI Prices: HC$1.00 MF$0.50
Westinghouse Research Labs., Pittsburgh, Pa.
GROWTH AND CHARACTERIZATION OF SINGLE CRYSTALS OF RARE EARTH COMPOUNDS.
Final rept.,
by R. R. Heikes. 31 Jul 66, 6p
Contract AF 49 (638)-1245

Descriptors: (*Rare earth compounds, *Single crystals), (*Crystal growth, Rare earth compounds), Carriers (Semiconductors), Transport properties, Band theory of solids, Doping, Crystal lattice defects, Phonons, Molecular electronics, Semiconductors.

A summary is given of studies the results of which are of scientific interest, mainly in the theory of the interaction between a lattice defect and phonons, in showing how conduction electrons are scattered by magnetic impurities, and in methods of growth of single crystals of rare earth compounds.

AD-640 226 **Field 20L, 7D**
Not available from CFSTI.
Baker Lab. of Chemistry, Cornell Univ., Ithaca, N. Y.
ELECTRIC, MAGNETIC, AND MAGNETIC RESONANCE PROPERTIES OF THE NONSTOICHIOMETRIC SODIUM-VANADIUM BRONZES,
by M. J. Sienko, and J. B. Sohn. 20 Sep 65, 8p
Grant AF-AFOSR-62-218
Proj. AF-9761
Task 976103
AFOSR-66-1557
Availability: Published in The Journal of Chemical Physics v44 n4 p1369-74 Feb 15 1966.

Descriptors: (*Sodium compounds, Transport properties), (*Vanadium compounds, Transport properties), (*Carriers (Semiconductors), Vanadium compounds), Salts, Single crystals, Electrical properties, Magnetic properties, Magnetic resonance, Resistance (Electrical), Thermoelectricity, Hall effect.

Identifiers: Vanadium bronzes.

Electric and magnetic studies were carried out on the system Na (x)V2O5 (0.24<x<0.33). Single-crystal electrical-conductivity measurements on Na0.33V2O5 show semiconducting behavior from 77 to 500K. A room-temperature conductivity of 230 mhos/cm with an activation energy of about 0.02 eV is observed. Thermoelectric power amounts to -116 microV/drg.K and is constant from 273 to 500K. The Hall voltage is too small to be observed, indicating >10 to the 19th power carriers/cc. Gouy-susceptibility measurements were carried out on a series of bronzes of variable Na/V ratio in the range 1.5 to 300K. All specimens are highly paramagnetic and follow a Curie-Weiss law between 63 and 300K. Weiss constants vary from -139 to -157K; Curie constants from 0.119 to 0.159. The effective magnetic moments range from 1.94 to 2.01 Bohr magnetons. Below 63K, the reciprocal susceptibility decreases more rapidly than linearly with temperature. No evidence of an antiferromagnetic transition is observed. The results, together with other electrical, ESR, and NMR data, cannot be explained by a hopping model but are consistent with a 3d t2g band model in which a majority of V4 (+) donor sites remain un-ionized over the temperature range investigated. (Author)

AD-640 257 **Field 20L, 18H, 20B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
RADIATION PHENOMENA IN ION CRYSTALS,
by K. Shvarts. 18 Apr 66, 18p FTD-TT-65-1734 TT-66-62421
Unedited rough draft trans. of Akademiya Nauk Latviiskoi SSR, Riga. Izvestiya, n4 p30-7 1964.

Descriptors: (*Crystals, *Radiation damage), (*Crystal lattice defects, Radiation damage), Impurities, Luminescence, Ferromagnetic materials, Scintillation counters, Transport properties, Color centers, Microstructure, USSR.

Research at the Physics Institute of the Latvian Academy of Sciences in the following areas is summarized: (1) energy transmission processes for basic substance to impurity and structural defects; (2) electric charge transmission processes in crystals; (3) microstructure of impurity centers and its change under the effect of radiation; (4) energy accumulation processes and creation of radiation defects. (Author)

AD-640 275 **Field 20L**
CFSTI Prices: HC$1.00 MF$0.50
South Dakota School of Mines and Technology, Rapid City. Dept. of Physics.
INTERNATIONAL CONFERENCE ON THE PHYSICS OF SEMICONDUCTORS, KYOTO, 8-13 SEPTEMBER 1966. INTERNATIONAL SYMPOSIUM ON LATTICE DEFECTS IN SEMICONDUCTORS, TOKYO, 5-6 SEPTEMBER 1966.
Technical rept.,
by Robert G. Morris. 15 Oct 66, 19p TR-20
Contract Nonr-2964 (01)
Proj. NR-017-208
Solid State Physics Project.

Descriptors: (*Symposia, *Semiconductors), Solid state physics, Crystal lattice defects, Band theory of solids, Transport properties, Optical properties, Radiation damage, Superconductors, Tunneling (Electronics).

The report is a personal view of the conferences covering the papers which the author heard and which particularly interested him. Thus it cannot be taken as a definitive report of the conference.

AD-640 303 Field 20L
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ELECTRICAL CONDUCTIVITY AND WIDTH OF FORBIDDEN ZONE OF SOLID SOLUTIONS OF SEMICONDUCTOR COMPOUNDS OF INDIUM PHOSPHIDE AND GALLIUM ARSENIDE.,
by N. N. Sirota, and L. A. Makovetskaya. 25 Apr 66, 8p FTD-TT-65-1999
TT-66-62452
Unedited rough draft trans. of Akademiya Navuk BSSR, Minsk. Doklady v8 n10 p632-3 1964.

Descriptors: (*Semiconductors, Electrical conductance), (*Indium alloys, Phosphorus alloys), (*Gallium alloys, Arsenic alloys), Temperature, Solid solutions, Band theory of solids, Carriers (Semiconductors), Heat of activation, USSR.

Identifiers: Gallium arsenide, Indium phosphide.

A study was undertaken of the temperature dependence of the electrical conductivity of the alloys of the system InP-GaAs in the range of temperature of 170 to 750 C and a determination was made of the energy of activation or width of the forbidden zone in accordance with the temperature change of the electrical conductivity in the area of natural conductivity.

AD-640 309 Field 20L, 20C
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THERMOELECTRIC PROPERTIES OF THE SYSTEM CuSbTe2--SnTe,
by R. Kh. Nina, Ya. I. Nasirov, and T. G. Osmanov. 25 Apr 66, 10p FTD-TT-65-1993
TT-66-62444
Unedited rough draft trans. of Akademiya Nauk Azerbaidzhanskoi SSR, Baku. Izvestiya. Seriya Fiziko-Matematicheskikh i Tekhnicheskikh Nauk. n5 p69-72 1964.

Descriptors: (*Thermoelectricity, *Tellurides), Antimony alloys, Copper alloys, Tin alloys, Tellurium alloys, Carriers (Semiconductors), Electrical conductance, Thermal conductivity, Phase studies, Solid solutions, USSR.

Identifiers: Copper antimony tellurides, Tin telluride, Electromotive force.

AD-640 317 Field 20L, 18D, 20B
CFSTI Prices: HC$2.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
PRELIMINARY INVESTIGATION OF THE STRUCTURAL PROPERTIES OF LITHIUM FLUORIDE SINGLE CRYSTALS,
by L. D. Miller. 6 Sep 66, 34p USNRDL-TR-1067
Proj. SF-011-05-11
Task 0503

Descriptors: (*Lithium compounds, Crystal structure), (*Fluorides, Crystal structure), (*Luminescence, *Color centers), Scintillation counters, Single crystals, Crystal growth, Doping, Magnesium, X rays, Ultraviolet radiation, Instrumentation.

Identifiers: Lithium fluoride, Thermoluminescence.

The purpose of the report is to describe the initial work performed in establishing a correlation between the solid state structure of lithium fluoride, and the thermoluminescence produced by interaction with ionizing radiation. Single crystals of lithium fluoride were grown, containing large concentrations of magnesium, in an attempt to determine the effects of this activator on the kinetics of thermoluminescence. The method of crystal growth and subsequent analysis of the crystals produced are discussed. Because F-centers in lithium fluoride have been extensively investigated it was felt useful to look at the methods of producing this center. The production of F-centers by means of x rays and by ultra-violet light of short wave-length is described. Light sources for producing ultra-violet light is also discussed. Finally, the instrumentation produced for this study together with future plans are discussed. (Author)

AD-640 424 Field 20L, 20B
CFSTI Prices: HC$1.00 MF$0.50
Carnegie Inst. of Tech., Pittsburgh, Pa.
KINETICS OF REACTIONS IN THE SOLID STATE.
Final rept. 1 Mar 55-30 Sep 66,
by G. M. Pound. 30 Sep 66, 25p
Contract Nonr-760 (08)
Proj. NR-031-184

Descriptors: (*Solid state physics, Reaction kinetics), Thermodynamics, Diffusion, Metals, Alloys, Nucleation, Crystal lattice defects, Evaporation, Polymers, Solids, Theory.

Topics include: bulk thermodynamic properties, diffusion in metals and alloys, nucleation, growth in solids, evaporation, dislocations, and structure of polymers.

AD-640 467 Field 20L, 20I
CFSTI Prices: HC$1.00 MF$0.50
Royal Inst. of Tech., Stockholm (Sweden). Microwave Dept.
PLASMA OSCILLATIONS IN SOLIDS.
Final scientific rept., 1 May 65-31 May 66,
by B. Agdur. 31 May 66, 12p
Contract AF 61 (052)-888
AFCRL-66-685

Descriptors: (*Semiconductors, *Plasma oscillations), Phonons, Carriers (Semiconductors), Magnetic fields, Ionization, Gain, Gas discharges, Sweden.

A discussion of work under the present contract is given. Among the problems treated are non-linear plasma wave interaction, dispersion properties and amplification of plasma waves in solids, amplification of optical phonons, amplification of acoustic phonons under non-isothermal conditions, properties of ionization waves in solids. (Author)

AD-640 488 Field 20L
CFSTI Prices: HC$3.00 MF$0.75
Naval Ordnance Lab., White Oak, Md.
SOLID STATE RESEARCH OF THE APPLIED PHYSICS DEPARTMENT FOR THE YEAR 1965,
by Wayne W. Scanlon. 29 Jun 66, 62p NOLTR-66-139
Proj. 221-0100

Descriptors: (*Solid state physics, Naval research laboratories), Ordnance laboratories, Magnetic materials, Semiconductors, Metallurgy, Infrared radiation, Glass, Optics, Superconductivity, Films, Magnetic properties.

The report summarizes the progress made in basic and applied solid state research in the Applied Physics Department of the U. S. Naval Ordnance Laboratory during 1965. The fields of research covered are metallic and non-metallic magnetic materials, semiconductors, infrared and metallurgy. (Author)

AD-640 514 Field 20L, 7B, 7D
CFSTI Prices: HC$1.00 MF$0.50
Illinois Univ., Urbana. Dept. of Chemistry and Chemical Engineering.
MAGNETIC PROPERTIES AND ELECTRONIC STRUCTURE OF LANTHANUM HYDRIDES.
Technical rept.,
by William G. Bos, and H. S. Gutowsky. 6 Sep 66, 14p TR-93
Contract Nonr-1834 (13)
Proj. NR-051-215
Research supported in part by NSF. Prepared for publication in Inorganic Chemistry.

Descriptors: (*Band theory of solids, Lanthanum compounds), (*Lanthanum compounds, *Hydrides), Magnetic properties, Nuclear magnetic resonance, Chemical bonds, Molecular orbitals.

Identifiers: Lanthanum hydrides, Magnetic susceptibility.

Previously the nuclear magnetic properties of the lanthanum hydrides have been interpreted in terms of a protonic model while the bulk susceptibilities have been attributed to an hydridic structure. The experimental results and their theoretical relation to the electronic structure are discussed. A simple band model is used to show that the hydridic structure also can account for the magnetic resonance results. Application of the band model to other metallic hydrides is considered briefly. (Author)

AD-640 518 Field 20L
CFSTI Prices: HC$2.00 MF$0.50
Delaware Univ., Newark. Dept. of Physics.
THE PERIODIC SOLUTIONS OF TRANSPORT- AND POISSON EQUATIONS FOR LAYERLIKE FIELD INHOMOGENEITIES.
Technical rept.,
by K. W. Boer. Oct 66, 46p TR-13
Contract DA 31-124-ARO (D)-173
AROD-4461:15

Descriptors: (*Transport properties, *Crystals), Diffusion, Cadmium compounds, Sulfides, Gallium compounds, Arsenides, Electron density, Mobility, Numerical analysis.

Time dependent solutions of the Poisson and transport equations containing drift and diffusion for the case of layerlike field inhomogeneities propagating underformed and with constant velocity through a crystal, are discussed in terms of an analysis of their projections in the n-E plane. Two principal models are discussed: one for a trap controlled crystal (CdS type), and the other for a trap-free crystal (GaAs type, Gunn effect) for field dependent recombination or field dependent mobility. It is found that, in addition to the 'triangular' domains, periodic propagating solutions can exist. Conditions on the value of the layer velocity and the current are derived. (Author)

AD-640 530 Field 20L, 11I
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
ELECTRONIC BAND STRUCTURE, FERMI SURFACE, AND MAGNETIC PROPERTIES OF PALLADIUM METAL,
by John O. Dimmock, Arthur J. Freeman, and Anna M. Furdyna. Nov 66, 2p MS-1466
Contract AF 19 (628)-5167
ESD-TR-66-216
Prepared in cooperation with National Magnet Lab., Mass. Inst. of Tech., Cambridge.
Availability: Published in Journal of Applied Physics v37 n3 p1256 Mar 1 1966.

Descriptors: (*Palladium, *Band theory of solids), Atomic energy levels, Magnetic properties.

Identifiers: Fermi surfaces.

The electronic energy bands of Pd metal have been determined using the nonrelativistic A.P.W. method. The Fermi surface, which consists of two hole surfaces and a compensating electron surface, agrees very well with the de Haas-van Alphen data of Vuillemin and Priestly. The electron surface is centered at Gamma and contains approximately 0.3 electrons per Pd atom. One hole surface con-

sists of a small pocket centered at chi. The other hole surface is open along the (100) directions in agreement with galvanomagnetic measurements. The Fermi energy lies slightly above a maximum in the calculated density of states N (E) as expected from studies of dilute alloys. Using the computed N (E sub F) we obtain an electronic contribution to the specific heat which is only about half the observed value, indicating an electron-phonon enhancement typical for d-band metals. The computed paramagnetic susceptibility chi (T) is much smaller than the experimental value, emphasizing the importance of exchange in markedly enhancing chi (T), particularly at low temperatures. (Author)

AD-640 531 **Field 20L**
Not available from CFSTI.
Lincoln Lab., Mass. Inst. of Tech., Lexington.
PSEUDOBINARY InSb-InTe SYSTEM.
Revised ed.,
by Alan J. Strauss, Mario D. Banus, and Mary C. Finn. 24 Jan 66, 8p JA-2672
Contract AF 19 (628)-5167
ESD-TR-66-233
Revision of manuscript submitted 21 Oct 65.
Availability: Published in Journal of the Electrochemical Society v113 n5 p458-64 May 1966.

Descriptors: (*Semiconductors, *Solid solutions), (*Indium alloys, *Antimony alloys), (*Indium compounds, *Tellurides), Intermetallic compounds, Calorimetry, X-ray diffraction analysis, Metallography, Phase studies, Superconductivity, Crystal lattices.

Identifiers: Indium antimonide, Indium tellurides.

The InSb-InTe pseudobinary system was investigated by thermal, metallographic, x-ray diffraction, and electron microprobe analysis. The results show that there is an unstable phase diagram in addition to the stable diagram. The principal features of the stable diagram are the same as those reported by Deneke and Rabenau, but the temperatures of the thermal arrests are appreciably different. The system contains one ternary compound, with nominal composition In3SbTe2, which is a peritectic phase unstable above 556C and below about 420C. According to the stable diagram, In3SbTe2 is the first phase to crystallize during cooling runs on melts containing between 15 mole % InTe (the eutectic composition) and 40 mole % InTe (the liquidus composition at the peritectic temperature), and InTe crystallizes as the primary phase from melts containing more than 40 mole % InTe. When experimental conditions permit sufficient supercooling, however, the ternary compound crystallizes as the primary phase from melts containing between 40 and 75 mole % InTe, since in this region there is an unstable liquidus which lies below the stable liquidus. The unstable liquidus temperature increases monotonically from 556C to 586C as the InTe content increases from 40 to 75 mole % InTe. For samples of the ternary compound crystallized close to 586C, the formula In4SbTe3 appears to be more appropriate than In3SbTe2. (Author)

N66-27040 **Field 20L**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
MOTION PICTURE PHOTOGRAPHY OF VARIATION PROCESSES OF THE DOMAIN STRUCTURE OF THIN FERROMAGNETIC FILMS IN A MAGNETIC FIELD.
Kinofl'mirovaniye Protsessov Izmeneiya Magwitnoy Structury Tonkikh Ferromagnitnykh Plenok V Magnitnom Pole
by V. A. Buravikhin, L. V. Kirenskiy, and M. K. Savchenko. 15 Sep 61, 8p NASA-TT-F-8071
Transl. Into English From Fiz. Metal. I Metalloved. (Ussr), V. 11, No. 4, 1961 P 529-532

Descriptors: *Ferromagnetic film, *Magnetic domain, *Metal film, *Motion picture, *Thin film, Alloy, Boundary, Domain, Ferromagnetism, Field, Film, Iron, Magnetic, Metal, Molybdenum, Motion, Nickel, Photography, Picture, Thin.

For abstract, see S 04 15.

N66-27321 **Field 20L**
CFSTI Prices HC$3.00 MF$0.75
Georgia Inst. Of Tech., Atlanta. School On Nuclear Engineering.
ELECTRON FLUX AND SPECTRUM IN THIN SILICON SAMPLES DURING GAMMA IRRADIATION - A COMPUTER STUDY.
by J. D. Clement, and D. M. Walker. Mar 66, 73p NASA-CR-75390, NE-4
Grant NSG-657

Descriptors: *Electron flux, *Gamma radiation, *Semiconductor device, Computer, Device, Displacement, Electron, Flux, Gamma, Photoelectricity, Photon, Radiation, Scattering, Semiconductor, Silicon.

For abstract, see S 04 15.

N66-27492 **Field 20L**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
MEASUREMENT OF ABSOLUTE LUMINOSITY YIELD OF POWDERED PHOSPHORS.
Izmereniye Absolyutnogo Vykhoda Svecheniya Poroshkoobraz Fosforov
by V. V. Antonov-romanovskiy, and M. I. Epshteyn. May 66, 13p NASA-TT-F-10111
Transl. Into English From Dokl. Akad. Nauk Sssr (Moscow), V. 64 No. 4, 1949 P 483-486

Descriptors: *Light absorption, *Luminosity, *Phosphor, Absorption, Balance, Energy, Excitation, Light, Luminescence, Measurement, Quantum, Radiation, Spectrum, Wavelength, Yield.

For abstract, see S 04 15.

N66-27758 **Field 20L**
CFSTI Prices HC$3.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
THEORETICAL INVESTIGATION OF ULTRASONIC ATTENUATION FOR FREE ELECTRONS IN THE PRESENCE OF A MAGNETIC FIELD.
by L. Flax. 1966, 58p NASA-TM-X-57601

Descriptors: *Acoustic attenuation, *Free electron, *Magnetic field, *Magnetoacoustic wave, *Ultrasonic wave, Acoustic, Attenuation, Coefficient, Electron, Equation, Field, Free, Magnetic, Magnetoacoustics, Metal, Propagation, Ultrasonic, Wave.

For abstract, see S 04 15.

N66-27940 **Field 20L**
CFSTI Prices HC$2.00 MF$0.50
Field Emission Corp., Mcminnville, Oreg.
INVESTIGATIONS OF ELECTRON EMISSION CHARACTERISTICS OF LOW WORK FUNCTION SURFACES QUARTERLY REPORT NO. 2, 1 JAN. - 31 MAR. 1966.
by A. E. Bell, L. C. Crouser, and L. W. Swanson. May 66, 38p NASA-CR-75630
Contract NASW-1082

Descriptors: *Electron emission, *Formation, *Work function, Adsorption, Cesium, Coating, Desorption, Distribution, Electron, Emission, Energy, Fluorine, Function, Low, Measurement, Oxygen, Surface, Tungsten, Work, Zirconium.

For abstract, see S 04 15.

N66-27950 **Field 20L**
CFSTI Prices HC$3.00 MF$0.75
Naval Ordnance Test Station, China Lake, Calif.
THEORETICAL AND EXPERIMENTAL INVESTIGATIONS OF THE PHYSICS OF CRYSTALLINE SURFACES FIRST QUARTERLY REPORT, 1 FEB. - 30 APR. 1966.
by E. Bauer. 1966, 66p NASA-CR-75641
NASA ORDER R-05-030-001

Descriptors: *Crystal surface, *Electron diffraction, *Surface energy, Crystal, Diffraction, Electron, Emission, Energy, Epitaxy, Film, Function, Interaction, Interface, Layer, Microscope, Physics, Single, Surface, Ultrahigh, Vacuum, Work.

For abstract, see S 04 15.

N66-28041 **Field 20L, 11F**
CFSTI Prices HC$3.00 MF$0.75
Lockheed Nuclear Products, Marietta, Ga.
EFFECT OF NUCLEAR RADIATION ON MATERIALS AT CRYOGENIC TEMPERATURES QUARTERLY REPORT NO. 3, 21 JAN. - 21 APR. 1966.
by C. A. Schwanbeck. May 66, 94p NASA-CR-54976, LAC-ER-8538
Contract NAS3-7985

Descriptors: *Aluminum, *Cryogenic temperature, *Fast neutron, *Mechanical property, *Neutron irradiation, *Radiation effect, *Titanium, Alloy, Cryogenic, Effect, Environment, Fast, Irradiation, Mechanical, Neutron, Property, Radiation, Strength, Temperature, Tensile.

For abstract, see S 04 15.

N66-28419 **Field 20L**
CFSTI Prices HC$2.00 MF$0.50
Kansas Univ., Lawrence.
INVESTIGATION OF ELECTROCALORIC EFFECTS IN FERROELECTRIC SUBSTANCES STATUS REPORT NO. 4, SEP. 1, 1965 - FEB. 28, 1966.
by G. G. Wiseman. 1966, 35p NASA-CR-75700
Grant NSG-575

Descriptors: *Crystal structure, *Electroluminescence, *Glycine, *Pyroelectricity, Calorie, Crystal, Electricity, Ferroelectrics, Measurement, Structure, Sulfate, Thermodynamics, Transition.

For abstract, see S 04 16.

N66-28479 **Field 20L**
CFSTI Prices HC$1.00 MF$0.50
Old Dominion Coll., Norfolk, Va. Dept. Of Physics.
DEFECT ANNEALING IN IRRADIATED SEMICONDUCTORS PROGRESS REPORT NO. 4, OCT. 1, 1965 - MAR. 31, 1966.
by W. M. Pritchard. 1 Apr 66, 23p NASA-CR-75722
Grant NSG-602

Descriptors: *Activation energy, *Annealing, *Germanium, *Isothermal process, *N-type semiconductor, Activation, Antimony, Computer, Defect, Doping, Energy, Irradiation, Isotherm, Model, Motion, Parameter, Process, Program, Semiconductor, Vacancy.

For abstract, see S 04 16.

N66-28739 **Field 20L**
CFSTI Prices HC$6.00 MF$1.50
India. Dept. Of Atomic Energy, Bombay.
LECTURES ON SOLID AND LIQUID STATE PHYSICS.
1965, 254p

Descriptors: *Crystal lattice, *Ferromagnetic resonance, *Liquid metal, *Neutron scattering, *Spectral line, *Theoretical physics, Alloy, Atom, Crystal, Diffusion, Dynamics, Elasticity, Ferromagnetism, Iron, Lattice,

Lead, Lecture, Line, Liquid, Metal, Motion, Neutron, Nickel, Physics, Resonance, Scattering, Sodium, Solid, Spectrum, Theory.

For abstract, see S 04 16.

N66-29299 **Field 20L**
CFSTI Prices HC$2.00 MF$0.50
Rice Univ., Houston, Tex.
RESEARCH ON THE PHYSICS OF SOLID MATERIALS SEMIANNUAL STATUS REPORT NO. 14, 1 NOV. 1965 - 30 APR. 1966.
by F. R. Brotzen. 1966, 35p NASA-CR-75814
Grant NSG-6-59

Descriptors: *Chemical reaction, *Materials science, *Metallurgy, *Solids, *Thermodynamics, Chemical, Electric, Magnetic, Material, Metal, Physics, Reaction, Research, Science, Solid, State.

For abstract, see S 04 16.

N66-29749 **Field 20L**
CFSTI Prices HC$3.00 MF$0.75
Delaware Univ., Newark. Dept. Of Physics.
INTRINSIC DEFECTS IN CD S TECHNICAL REPORT NO. 9.
by C. A. Kennedy. Jun 66, 74p NASA-CR-76029
Grant NSG-573

Descriptors: *Cadmium sulfide, *Crystal structure defect, *Glow discharge, *Photoconductivity, Cadmium, Crystal, Curve, Defect, Discharge, Glow, Heat, Impurity, Intrinsic, Platelet, Response, Spectral, Structure, Sulfide, Treatment.

For abstract, see S 04 16.

N66-29908 **Field 20L**
CFSTI Prices HC$1.00 MF$0.50
Atomics International, Canoga Park, Calif.
INVESTIGATION OF SUPERCURRENT INSTABILITIES IN TYPE II SUPERCONDUCTORS FIRST QUARTERLY PROGRESS REPORT.
13 May 66, 21p NASA-CR-76060, AI-66-87
Contract NAS8-20552

Descriptors: *Microstructure, *Plastic deformation, *Superconductor, *Titanium alloy, Alloy, Current, Deformation, Density, Heat, Instability, Niobium, Plastic, Quantity, Titanium, Treatment.

For abstract, see S 04 16.

N66-35727 **Field 20L**
CFSTI Prices HC$2.00 MF$0.50
Naval Ordnance Test Station, China Lake, Calif.
THE FORMATION OF THIN CONTINUOUS FILMS FROM ISOLATED NUCLEI.
by E. Bauer, A. K. Green, K. M. Kunz, and H. Poppa. 1965, 41p NASA-CR-68778
NASA ORDER R-05-030-001
Presented At A Conf.

Descriptors: *Electron beam, *Residual gas, *Thin film, Alkali, Beam, Condition, Electron, Film, Gas, Growth, Halide, Metal, Model, Residual, Surface, Thin.

For abstract, see S 04 21.

N66-35731 **Field 20L**
CFSTI Prices HC$1.00 MF$0.50
Delaware Univ., Newark. Dept. Of Physics.
X-RAY DAMAGE AND ANNEALING OF THESE DEFECTS IN CD S SINGLE CRYSTALS TECHNICAL REPORT NO. 1.
by K. W. Boer, J. C. Oconnell, and R. Schubert. Nov 65, 13p NASA-CR-68250
Grant NSG-573
Submitted For Publication

Descriptors: *Annealing, *Cadmium sulfide, *Single crystal, *X-ray irradiation, Cadmium, Conductivity, Crystal, Damage, Diffusion, Distribution, Glow, Irradiation, Photoconductivity, Single, Spectral, Sulfide, Sulfur, Vacancy, X-ray.

For abstract, see S 04 21.

N66-35778 **Field 20L**
CFSTI Prices HC$1.00 MF$0.50
National Bureau Of Standards, Boulder, Colo. Cryogenic Data Center.
CRYOGENIC DATA CENTER ACTIVITIES SEMIANNUAL PROGRESS REPORT, 1 JAN. - 30 JUN. 1966.
by V. J. Johnson, N. A. Olien, and R. B. Stewart. 30 Jun 66, 24p NASA-CR-77574, NBS-9254
NASA ORDER R-06-006-046

Descriptors: *Cryogenic propellant, *Data handling system, *Thermodynamic property, Activity, Argon, Center, Compilation, Cryogenic, Data, Documentation, Fluid, Handling, Hydrogen, Liquid, Oxygen, Propellant, Property, Publication, Solid, System, Thermodynamic, Transition, Transport, Vapor, Viscosity.

For abstract, see S 04 21.

N66-36135 **Field 20L**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
OHMIC TRANSPORT CONTACT FOR A2 B6-TYPE PHOTOCONDUCTORS.
Do Pitannya Pro Omichniy Prozoriy Kontakt Do Fotoprovidnikiv Tipu A2b6
by YU. G. Pysmenniy, S. V. Svechnikov, and YU. O. Tkhorik. Sep 66, 13p NASA-TT-F-10272
Transl. Into English From Ukr. Fiz. Zh. (Kiev), V. 11, No. 1, 1966 P 40-44

Descriptors: *Cadmium compound, *Contact potential, *Oxide film, *Photoconductive cell, Cadmium, Cell, Characteristics, Compound, Contact, Crystal, Current, Film, Ohm, Oxide, Photoconductivity, Potential, Resistance, Single, Sulfide, Temperature, Transparency, Voltage.

For abstract, see S 04 21.

N66-36137 **Field 20L**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
PREPARATION OF CD S SINGLE CRYSTALS AND THEIR STRUCTURAL AND ELECTROPHYSICAL PROPERTIES.
Vigotovlennya, Strukturni Ta Elektrofizichni Vlastivosti Cds-monokristaliv
by O. P. Galushka, I. D. Konozenko, E. O. Muzalevkii, L. G. Nikolayeva, and A. I. Rovna. Sep 66, 16p NASA-TT-F-10277
Transl. Into English From Ukr. Fiz. Zh. (Kiev), V. 11, No. 2, 1966 P 171-176

Descriptors: *Cadmium sulfide, *Crystal structure defect, *Growth, *Sublimation, Cadmium, Crystal, Defect, Electric, Electrophysics, Large, Material, Method, Physical, Preparation, Property, Semiconductor, Single, Structure, Sulfide, Zone.

For abstract, see S 04 21.

N66-36265 **Field 20L**
CFSTI Prices HC$1.00 MF$0.50
George Washington Univ., Washington, D. C.
ORGANIC SYSTEMS INVOLVING TRANSITION METALS FOR OPTICAL LASER MATERIALS SEMIANNUAL RESEARCH REPORT, 1 NOV. 1965 - 30 JUN. 1966.
by N. Filipescu. 10 Aug 66, 7p NASA-CR-77913
Grant NSG-603

Descriptors: *Fluorescent emission, *Laser, *Organic compound, *Transition element, Application, Compound, Element, Emission, Evaluation, Fluorescence, Metal, Optics, Organic, Sensitizer, Transition.

For abstract, see S 04 21.

PB-170 915 **Field 20L**
CFSTI Prices: HC$9.60 MF$0.75
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
ETUDE DES SUPRACONDUCTEURS DU SYSTEME ALUMINIUM-MAGNESIUM (Study of Super-Conductors in the Aluminium-Magnesium System).
Doctoral thesis,
by Bernard Bonnin. 1966, 99p CEA-R-2906
Text in French; Summary in English.

Descriptors: (*Superconductors, Magnetic properties), (*Aluminum alloys, Superconductivity), (*Magnesium alloys, Superconductivity), Test equipment, Cryostats, Pumps, Electric bridges, Crystal lattice defects, Magnetic fields, Transition temperature, Specific heat, France.

An apparatus was designed and built for the measurement of the magnetization of superconducting alloys by the classical method of extraction. Its originality is due to the employment of a cryostat having two helium baths. The lowest temperature reached by pumping on the innermost helium bath using a primary pump combined with a BOOSTER pump is 0.75K. Temperatures are determined with the aid of Hartshorn bridge. With this apparatus, it was possible to study the influence of extended defects on the irreversible behaviour of the magnetization of aluminium-magnesium alloys. It was shown that the effect of these defects is important chiefly in the superconductive alloys of the second kind. The introduction of the extended defects was controlled by electron microscopy and by the measure of the residual resistivities. Finally, measurements were made for these alloys in the critical fields Hc, Hc1, Hc2, the transition temperature Tc and the coefficients of electronic specific heat. (Author)

PB-170 936 **Field 20L, 20C, 14B**
CFSTI Prices: HC$1.60 MF$0.50
Strasbourg Univ. (France). Laboratoire de Mineralogie.
CROISSANCE DES CRISTAUX (Crystals Growth),
by Stanislas Goldsztaub. 10 Dec 65, 13p
CEA-S-4
Presented at Seminaire de Chimie des Solides Institut National des Sciences et Techniques Nucleaires.

Descriptors: (*Crystal growth, Dynamics), Test equipment, Interferometers, Polarizing filters, Solutions, Concentration (Chemistry), Thermal properties, Diffusion, Phase studies, France.

An interferometric method with polarised light is presented which makes it possible to follow the variation of concentration of a solution in the vicinity of an immersed crystal of a dissolved element, either during crystal growth or during crystal dissolution. This method could also be applied to the study of the thermal gradient of a liquid in the vicinity of its solidification zone. Comparing crystal growth kinetics results obtained by direct measurement and by diffusion determination in the liquid phase, it is shown a coefficient due to a phenomenon of 'sticking wall' must be added. (Author)

AD-639 646 **See Field 11G**

AD-639 667 **See Field 9E**

AD-639 803 **See Field 9C**

AD-639 841 **See Field 9A**

AD-639 875 **See Field 11F**

AD-640 032 See Field 20E

AD-640 149 See Field 20E

AD-640 185 See Field 20B

AD-640 190 See Field 20B

AD-640 281 See Field 9A

AD-640 484 See Field 9A

AD-640 527 See Field 20C

LA-3510 See Field 20B

20M. THERMODYNAMICS

AD-453 256 **Field 20M**
CFSTI Price: HC$3.60
Royal Aircraft Establishment, Farnborough (England).
THE THERMAL ACCOMMODATION OF HELIUM AND ARGON ON TUNGSTEN AND PLATINUM AT ELEVATED TEMPERATURES,
by W. Watt, and R. Moreton. Aug 64, 36p
Technical note TN-CPM-80

Descriptors: (*Argon, Adsorption), (*Helium, Adsorption), (*Adsorption, Energy), Tungsten, Platinum, Nitrogen, Vaporization, Energy, Heat transfer, Physical chemistry, Surfaces, Great Britain.

The thermal accommodation coefficients of helium and argon were measured on tungsten at temperatures of 800 to 1512 C under conditions which are considered to give a clean tungsten surface after flashing to 2400 C. Measurements of the accommodation of the same gases and of nitrogen have also been made on platinum at temperatures of 910 to 1320 C. An accommodation coefficient of 0.018 for helium on tungsten and of 0.24 for argon, both constant over the temperature range studied, was found. On platinum these gases and also nitrogen had constant accommodation coefficients over the range studied, the values being 0.026, 0.38 and 0.34 for helium, argon and nitrogen respectively. The values for helium on tungsten have been compared with those obtained by other workers at temperatures of 170 to 58 C and reasonable agreement has been found. It is concluded that the thermal accommodation of helium on tungsten is independent of temperature up to 1512 C. (Author)

AD-639 820 **Field 20M**
Not available from CFSTI.
Imperial Coll. of Science and Technology, London (England). Dept. of Physics.
RELATIVISTIC TRANSFORMATION LAWS FOR THERMODYNAMIC VARIABLES,
by T. W. B. Kibble. 18 Oct 65, 9p
Grant AF-EOAR-46-64
Proj. AF-9751
Task 975101
AFOSR-66-0807
Availability: Published in Il Nuovo Cimento ser10 v41 p72-8 1966.

Descriptors: (*Thermodynamics, *Relativity theory), Phase studies, Energy, Statistical mechanics, Great Britain.

Arzelies and Gamba have recently suggested that the hitherto generally accepted transformation laws of relativistic thermodynamics are incorrect, and in need of revision. Superficially their results resemble those of Ott, inasmuch as all three authors advocate the same transformation laws for temperature and heat transfer. However, they do not agree about the transformation laws for certain other thermodynamic variables, notably the internal energy of the system. It is the purpose of this note to point out that the arguments presented by Arzelies and Gamba are wrong, particularly in respect of the transformation laws of energy and work. The author's results are in complete agreement with those of Ott.

AD-640 024 **Field 20M**
CFSTI Prices: HC$2.00 MF$0.50
Lockheed Missiles and Space Co., Palo Alto, Calif. Research Labs.
RADIANT HEAT TRANSFER IN A SPHERICALLY SYMMETRIC MEDIUM,
by R. F. Chisnell. Aug 66, 31p Rept. no. 6-76-66-20

Descriptors: (*Thermal radiation, Blunt bodies), Spheres, Gas flow, Differential equations.

The radiant heat transfer from a spherically symmetric medium to an interior spherical boundary is considered. The medium is assumed to be gray with a constant absorption coefficient. Solutions are presented in terms of an emission function which may depend arbitrarily on the radial co-ordinate. The exact solution is obtained and compared with the known planar slab approximation. The differential approximation and a new extension of the differential approximation, in which only body orientated radiation is considered, are also applied to the same problem. Numerical values are obtained for emission functions having a power law dependence on distance from the inner boundary. (Author)

AD-640 091 **Field 20M**
CFSTI Prices: HC$4.00 MF$0.75
California Univ., Los Angeles. Dept. of Physics.
EXPERIMENTAL INVESTIGATION OF THE LAMBDA TRANSITION OF LIQUID HELIUM USING ACOUSTIC TECHNIQUES.
Technical rept.,
by Martin Barmatz. Aug 66, 112p TR-25
Contract Nonr-233 (48)

Descriptors: (*Helium, Phase studies), Sound, Velocity, Attenuation, Liquefied gases, Cryogenics, Superfluidity, Thermal radiation, Temperature, Density, Specific heat.

The velocity and attenuation of first sound have been measured simultaneously to within microdegrees of the lambda transition of liquid helium. Measurements were made in the frequency range of 20-100 kc. With the high Q modes of the resonator, relative sound velocity measurements of one part in 100,000 could be obtained. Above the transition the velocity of sound had the temperature dependence predicted by the Pippard Theory out to 5 millidegrees from the lambda point. The velocity of sound below the transition does not agree with the Pippard Theory except within a fraction of a millidegree of the transition. The added temperature dependence beyond that expected from the Pippard theory can be fit to a series expansion in /delta T/. This additional dependence is postulated to be due to the effects of the order parameter. The minimum of the sound velocity at the lambda point was found to be finite and equal to 217.05 m/s. Using the convective properties of the resonator, the position of the density maximum was found to be approximately 6.2 millidegrees above the lambda point. (Author)

AD-640 474 **Field 20M, 12A**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE THEORY OF THE HEAT POTENTIAL (INSTALLMENT I). DIRECT VALUES OF THE HEAT POTENTIALS AND THE REVERSE PROBLEM IN THE THEORY OF THE HEAT POTENTIAL,
by Wang Tung. 8 Apr 66, 21p FTD-TT-65-1686
TT-66-62463
Unedited rough draft trans. of Zhurnal Vychislitel'noi Matematiki i Matematicheskoi Fiziki (USSR) v4 n4 p660-70 1964.

Descriptors: (*Heat, Potential theory), Boundary value problems, Propagation, Partial differential equations, Operators (Mathematics), USSR.

NAA-SR-11949 **Field 20M**
CFSTI Prices: HC$3.00 MF$0.75
Atomics International, Canoga Park, Calif.
EFFECTS OF SOME SURFACE AND SYSTEM CONTAMINANTS ON MERCURY POOL BOILING HEAT TRANSFER,
by T. T. Shimazaki. 15 Jul 66, 62p
Contract AT(11-1)-GEN-8

Descriptors: (*Heat transfer, *Boilers).

For abstract, see N 20 20.

N66-27227 **Field 20M**
CFSTI Prices HC$4.00 MF$1.00
Avco Corp., Wilmington, Mass. Space Systems Div.
DEVELOPMENT OF PASSIVE TEMPERATURE CONTROL COATINGS FOR USE ON THE APOLLO VEHICLE ABLATIVE THERMAL PROTECTION SYSTEM FINAL REPORT.
by R. E. Gannon, C. T. Hughes, T. S. Laszlo, and M. Rand. Apr 66, 128p NASA-CR-65366, AVSSD-0012-66-RR
Contract NAS9-3406

Descriptors: *Apollo spacecraft, *Protective coating, *Temperature control, *Thermal protection, Ablation, Aluminum, Cloth, Coating, Control, Fabric, Fiberglass, Foil, Multilayer, Passive, Protection, Spacecraft, System, Temperature, Thermal.

For abstract, see S 04 15.

N66-27497 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
EMISSIVITY OF A PINNACLED SURFACE. INVESTIGATION OF AN EMISSIVE, FIN-TUBE SYSTEM.
Izluchatel'naya Sposobnost Zubchatoy Poverkhnosti, Issledovaniye Izluchatel'noy Sistemy S Orebrennymi Trubkami
by YU. A. Vasanov, and YU. G. Zhulev. May 66, 29p NASA-TT-F-10134
Transl. Into English From A Russian Publ., 1965

Descriptors: *Black body radiation, *Cooling fin, *Emission, *Thermal radiation, Black, Body, Cooling, Equation, Fin, Heat, Radiation, Surface, Temperature, Thermal, Thermodynamics, Triangle, Zero.

For abstract, see S 04 15.

N66-27502 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
THERMAL CHARACTERISTICS OF A PEBBLE BED HEATER.
by N. Hayashi. Jun 66, 29p NASA-TT-F-10188, NAL-TR-52
Transl. Into English Of Natl. Aerospace Lab. (Tokyo), No. 52, 1963 P 1-15

Descriptors: *Heating equipment, *Stagnation temperature, *Supersonic wind tunnel, *Thermal expansion, Bed, Circular, Equation, Equipment, Expansion, Flow, Fluid, Heat transfer, Heating, Pebble, Stagnation, Supersonic, Temperature, Thermal, Tube, Tunnel, Wind.

For abstract, see S 04 15.

N66-27738 **Field 20M**
CFSTI Prices HC$3.00 MF$0.75
Pratt And Whitney Aircraft, East Hartford, Conn. Space Power Systems.
ANALYTICAL STUDY OF LIQUID METAL CONDENSING INSIDE TUBES.
by H. R. Kunz. Jan 65, 96p NASA-CR-54352,

PWA-2530
Contract NAS3-2335

Descriptors: *Annular flow, *Circular tube, *Liquid metal, *Two-phase flow, Analysis, Annulus, Circular, Condensation, Film, Flow, Fluid, Heat transfer, Liquid, Metal, Phase, Thickness, Tube, Two.

For abstract, see S 04 15.

N66-27748 **Field 20M**
CFSTI Prices HC$3.00 MF$0.50
Massachusetts Inst. Of Tech., Cambridge. Center For Space Research.
USE OF THERMAL RERADIATIVE EFFECTS IN SPACECRAFT ATTITUDE CONTROL.
by C. A. Peterson. May 66, 60p NASA-CR-75450, CSR-T-66-3
Contract NASR-249

Descriptors: *Attitude control, *Oscillation, *Spacecraft control, *Thermal radiation, *Vibration damping, Absorption, Attitude, Control, Damping, Delay, Emission, Lag, Nonconservative, Radiation, Spacecraft, Surface, Thermal, Time, Torque, Vibration.

For abstract, see S 04 15.

N66-27929 **Field 20M**
CFSTI Prices HC$3.00 MF$0.75
Missouri School Of Mines And Metallurgy, Rolla.
THE APPLICATION OF SOME THERMODYNAMIC PRINCIPLES TO ESTIMATE THE LIKELIHOOD OF LIFE IN THE SOLAR SYSTEM, PART I FINAL REPORT, FEB. 1965-FEB. 1966.
by J. P. Wesley. 1966, 67p NASA-CR-75650
Contract NGR-26-004-014

Descriptors: *Life, *Solar system, *Thermodynamics, Conductivity, Conversion, Efficiency, Energy, Engine, Entropy, Estimation, Heat, Mechanical, Power, Solar, Sun, System.

For abstract, see S 04 15.

N66-27934 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
Catholic Univ. Of America, Washington, D. C. Dept. Of Space Science And Applied Physics.
RADIATIVE TRANSFER FOR PARALLEL STREAMS OF RADIATING GASES.
by Y. C. Whang. Jan 66, 29p NASA-CR-75614
Grant NSG-586
Its Rept.-66-001

Descriptors: *Convective heat transfer, *Gas stream, *Radiative heat transfer, Convection, Differential, Emission, Equation, Gas, Heat transfer, Incompressible, Inviscid, Parallel, Radiative, Stream, Two.

For abstract, see S 04 15.

N66-28016 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
RADIATIVE INTERACTIONS BETWEEN ABSORBING- EMITTING AND FLOWING MEDIA WITH INTERNAL ENERGY GENERATION.
by J. R. Howell. 1966, 37p NASA-TM-X-52202
Presented At The Am. Inst. Of Aeronautics And Astronautics Fourth Aerospace Sci. Meeting, Los Angeles, 27-29 Jun. 1966

Descriptors: *Energy transfer, *Internal energy, *Monte carlo method, *Radiation absorption, *Radiation emission, Absorption, Capacity, Coefficient, Emission, Energy, Flow, Flux, Generator, Geometry, Heat, Interaction, Internal, Mathematics, Medium, Radiation, Radiative, Rate, Source.

For abstract, see S 04 15.

N66-28144 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
Institut Royal Meteorologique De Belgique, Brussels.
ON THE THERMODYNAMIC EQUIVALENT TEMPERATURE.
Sur La Temperature Thermodynamique Equivalente
by L. Dufour. 1965, 29p
In French Its Publ. Ser. B, No. 46

Descriptors: *Atmosphere, *Atmospheric temperature, *Condensation, *Thermodynamics, *Water vapor, Adiabat, Air, Atmospheric, Condition, Dry, Equivalence, Equivalent, Humidity, Isobar, Process, Vapor, Water.

For abstract, see S 04 15.

N66-28371 **Field 20M**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
DETERMINATION OF THERMOPHYSICAL CHARACTERISTICS OF MATERIALS AS FUNCTIONS OF TEMPERATURES.
Ob Opredelenii Teplofizicheskikh Kharateristik Materialov Kak Funktsiy Temperatury
by G. A. Surkov. Jun 66, 12p NASA-TT-F-10187
Transl. Into English From Dokl. Akad. Navk Belorussk. Ssr (Minsk), V. 10, No. 1, 1966 P22-25

Descriptors: *Mathematics, *Temperature field, *Thermophysical property, Body, Capacity, Characteristics, Conductivity, Coordinate, Density, Determination, Field, Function, Heat, Material, Property, Space, Symmetry, Temperature, Thermal, Thermophysical, Time.

For abstract, see S 04 15.

N66-29224 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
Phylatron Corp., Columbus, Ohio.
SOLID STATE CRYOGENIC TEMPERATURE SENSOR FINAL REPORT.
by W. H. Closser, and R. R. Speers. 1 Feb 66, 31p NASA-CR-54962
Contract NAS3-6219

Descriptors: *Gallium arsenide, *Solid state device, *Thermometer, Arsenide, Cryogenic, Cryogenic temperature, Development, Device, Electric, Gallium, Property, Sensor, Solid, State, Temperature.

For abstract, see S 04 16.

N66-29291 **Field 20M**
CFSTI Prices HC$4.00 MF$1.00
General Dynamics/astronautics, San Diego, Calif.
ENVIRONMENTAL CONTROL STUDY OF SPACE VEHICLES. PART III - THERMAL CONTROL TECHNIQUES AND SYSTEMS.
by J. C. Ballinger, and E. H. Christensen. 31 Dec 60, 125p NASA-CR-72005, GD/A-ERR-AN-051

Descriptors: *Control system, *Environmental control, *Heat regulation, *Space vehicle, *Temperature control, Activity, Analysis, Condition, Control, Environment, General, Heat, Mission, Passive, Regulation, Requirement, System, Technique, Temperature, Thermal.

For abstract, see S 04 16.

N66-29355 **Field 20M**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
DEVELOPMENT OF ABLATION SENSORS FOR ADVANCED REENTRY VEHICLES.
by P. J. Le bel, and J. A. Russell III. 1965, 5p
NASA-TM-X-56771
Presented At The Instr. Soc. Of Am. 20th Ann. Conf. And Exhibit, Los Angeles, 4-7 Oct. 1965

Descriptors: *Ablating material, *Heat shield, *Reentry vehicle, *Sensor, Ablation, Char, Design, Ground, Heat, Interface, Layer, Material, Operation, Parameter, Reentry, Shield, Spring, Surface, Test, Thermal, Vehicle, Wire.

For abstract, see S 04 16.

N66-29356 **Field 20M**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
ENERGY TRANSPORT BY THERMAL, FIELD EMISSION.
by J. F. Morris. 19 Jul 65, 14p NASA-TM-X-56751
Submitted For Publication

Descriptors: *Cooling, *Emitter, *Energy transfer, *Field emission, *Thermal emission, Barrier, Current, Density, Electric, Electron, Emission, Energy, Escape, Field, Heat transfer, Potential, Surface, Thermal, Transfer, Transport.

For abstract, see S 04 16.

N66-29384 **Field 20M**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
CONTINUOUS SKIN CONSTRUCTION TECHNIQUE FOR FABRICATING MODELS FOR AERODYNAMIC HEAT- TRANSFER STUDIES INVOLVING VERY SMALL TRANSIENT HEATING RATES.
by W. D. Harvey. 1965, 19p NASA-TM-X-56770
Presented At The Instr. Soc. Of Am. 20th Ann. Isa Conf. And Exhibit, Los Angeles, 4-7 Oct. 1965

Descriptors: *Aerodynamic heating, *Heat transfer, *Hotshot tunnel, *Instrumentation, Aerodynamic, Calorimeter, Change, Complex, Heating, Hotshot, Measurement, Shape, Sheet, Simple, Support, Surface, Technique, Temperature, Thermocouple, Tunnel, Wire.

For abstract, see S 04 16.

N66-29430 **Field 20M**
CFSTI Prices HC$1.00 MF$0.50
Alabama Univ., University. Bureau Of Engineering Research.
THE STUDY OF TRANSIENT HEAT TRANSFER PROBLEMS QUARTERLY PROGRESS REPORT VI, 1 JUN. - 31 AUG. 1964.
by R. M. Hollub. 31 Aug 64, 14p NASA-CR-57810
Contract NAS8-5217

Descriptors: *Calorimeter, *Data acquisition, *Heat transfer, *Test facility, Acquisition, Calibration, Data, Design, Fabrication, Facility, Flow, Gas, High temperature, Hot, Hot gas, Section, Test, Transient.

For abstract, see S 04 16.

N66-29465 **Field 20M**
CFSTI Prices HC$6.00 MF$1.50
Princeton Univ., N. J. Guggenheim Labs. For The Aerospace Propulsion
A THEORETICAL STUDY OF NONLINEAR TRANSVERSE COMBUSTION INSTABILITY IN LIQUID PROPELLANT ROCKET MOTORS.
by B. T. Zinn. May 66, 295p NASA-CR-75894
Contract NASR-217
Its Tech. Rept.-732

Descriptors: *Combustion instability, *Liquid propellant rocket engine, *Subsonic flow,

Combustion, Crocco method, Flow, Instability, Laval number, Liquid, Nonlinear, Nozzle, Propellant, Rocket engine, Subsonic, Transverse.

For abstract, see S 04 16.

N66-29477 **Field 20M**
CFSTI Prices HC$3.00 MF$0.75
General Dynamics Corp., San Diego, Calif. John Jay Hopkins Lab. For Pure And Applied
MEASUREMENT OF NEUTRON SPECTRA IN LIQUID HYDROGEN QUARTERLY PROGRESS REPORT, PERIOD ENDING MAR. 17, 1966.
by G. K. Houghton, and G. D. Trimble. 7 Mar 66, 70p NASA-CR-54977, GA-7064
Contract NAS3-6217

Descriptors: *Fast neutron, *Liquid hydrogen, *Neutron spectrum, *Thermal neutron, Cryostat, Fast, Hydrogen, Liquid, Measurement, Neutron, Source, Spectrum, Thermal.

For abstract, see S 04 16.

N66-29682 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYSIS OF COUETTE FLOW AND HEAT TRANSFER BETWEEN PARALLEL PLATES ENCLOSING RAREFIED GAS BY MONTE CARLO.
by M. Perlmutter. 1966, 32p NASA-TM-X-52218
Presented At The 5th Intern. Symp. On Rarefied Gas Dyn., Oxford, England, 4-8 Jul. 1966

Descriptors: *Couette flow, *Monte carlo method, *Parallel plate, *Rarefied gas, Analysis, Channel, Couette, Distribution, Flow, Gas, Heat transfer, History, Iteration, Method, Molecule, Parallel, Plate, Rarefaction, Shear, Sphere, Target, Velocity, Wall.

For abstract, see S 04 16.

N66-29727 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
HEAT TREATMENT OF TUNGSTEN BULBS.
Obrobka Cieplna Zarnikow Wolframowych
by B. Jesionek, and A. Kostkowski. Jun 66, 28p NASA-TT-F-10185
Transl. Into English From Rudy I Metale Niezelazne (Katowice) V. 10, No. 2, 1965 P 59-65

Descriptors: *Filament, *Heat treatment, *Light bulb, *Tungsten, Bulb, Characteristics, Deformation, Heat, Light, Operation, Optimization, Property, Recrystallization, Treatment, Wire.

For abstract, see S 04 16.

N66-29746 **Field 20M**
CFSTI Prices HC$7.00 MF$1.75
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
STAGNATION-POINT SOLUTIONS FOR INVISCID, RADIATING SHOCK LAYERS.
by W. B. Olstad. Apr 66, 319p NASA-TM-X-57696

Descriptors: *Approximation method, *Blunt body, *Radiant energy, *Shock layer, *Stagnation point, Approximation, Blunt, Body, Effect, Energy, Heat transfer, Layer, Meteor, Method, Perturbation, Point, Radiance, Radiation, Shock, Stagnation.

For abstract, see S 04 16.

N66-35647 **Field 20M**
CFSTI Prices HC$2.50 MF$0.75
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYSIS AND CORRELATION OF HEAT-TRANSFER COEFFICIENT AND FRICTION FACTOR DATA FOR DILUTE GAS-SOLID SUSPENSIONS.
by S. Lieblein, R. Pfeffer, and S. Rossetti. Sep 66, 62p NASA-TN-D-3603

Descriptors: *Friction measurement, *Gas flow, *Heat-transfer coefficient, *Pressure drop, *Solid suspension, Coefficient, Correlation, Dilution, Drop, Factor, Flow, Friction, Gas, Heat transfer, Loading, Measurement, Pressure, Ratio, Solid, Suspension, Tube.

For abstract, see S 04 21.

N66-35648 **Field 20M**
CFSTI Prices HC$2.50 MF$0.75
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
SOME PRACTICAL ASPECTS OF SURFACE TEMPERATURE MEASUREMENT BY OPTICAL AND RATIO PYROMETERS.
by J. R. Branstetter. Sep 66, 71p NASA-TN-D-3604

Descriptors: *Heat equation, *Optical pyrometer, *Radiative heat transfer, *Surface temperature, *Temperature measurement, Calibration, Equation, Error, Heat transfer, Material, Measurement, Opaque, Optical, Pyrometer, Radiation, Ratio, Surface, Temperature.

For abstract, see S 04 21.

N66-35661 **Field 20M**
CFSTI Prices HC$2.50 MF$0.75
Trw Systems, Redondo Beach, Calif.
DETERMINATION OF THERMOPHYSICAL PROPERTIES OF ABLATIVE MATERIALS. PHASE I - LABORATORY DETERMINATIONS. PART A - HEAT CAPACITY, DENSITY, DECOMPOSITION AND MELT TEMPERATURE.
by J. L. Blumenthal, R. D. Larson, and R. C. Nordberg. 1 Jul 66, 79p NASA-CR-65486, TRW-04812-6001-R000
Contract NAS9-4518

Descriptors: *Ablating material, *Apollo spacecraft, *Propulsion system, *Thermophysical property, Ablation, Capacity, Decomposition, Density, Determination, Heat, Laboratory, Material, Melting, Property, Propulsion, Spacecraft, System, Technique, Temperature, Testing, Thermophysical.

For abstract, see S 04 21.

N66-36069 **Field 20M**
CFSTI Prices HC$3.00 MF$0.50
Colorado State Univ., Fort Collins.
HEAT TRANSFER FROM LARGE DIAMETER PIRANI GAUGES OPERATING DOWN TO MICROTORR.
by J. E. Braly. Mar 66, 53p NASA-CR-77857
Grant NSG-570

Descriptors: *Heat transfer, *Pirani gauge, Apparatus, Chamber, Conduction, Cylinder, Film, Gauge, Measurement, Operation, Pressure, Temperature, Thin, Vacuum.

For abstract, see S 04 21.

N66-36076 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
Pennsylvania Univ., Philadelphia.
THE DETERMINATION OF THERMAL DIFFUSIVITIES OF THERMAL ENERGY STORAGE MATERIALS. PART I - SOLIDS UP TO MELTING POINT.
by M. Altman, H. Chang, and R. Sharma. 1964, 38p NASA-CR-77797
Grant NSG-316

Descriptors: *Energy storage device, *Melting point, *Solids, *Thermal diffusion, Conductor, Device, Diffusion, Energy, High, Material, Measurement, Melting, Point, Storage, Temperature, Thermal.

For abstract, see S 04 21.

N66-36093 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
SOLUTION OF RAREFIED GAS TRANSPORT PROBLEMS.
by M. Perlmutter. 1965, 28p NASA-TM-X-52110
Presented At The Am. Soc. Of Mech. Engr. Winter Ann. Meeting, Chicago, 7-11 Nov. 1965

Descriptors: *Gas transport, *Heat transfer, *Monte carlo method, *Rarefied gas, Collision, Density, Distribution, Gas, Heat, Molecule, Problem, Rarefaction, Solution, Temperature, Transfer, Transport.

For abstract, see S 04 21.

N66-36125 **Field 20M**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
WIND-TUNNEL INVESTIGATION OF THERMAL AND PRESSURE ENVIRONMENTS IN THE BASE OF THE SATURN S-IC BOOSTER FROM MACH 0.1 TO 3.5.
by R. A. Wasko. Sep 66, 21p NASA-TN-D-3612

Descriptors: *Base pressure, *Saturn s- ic stage, *Wind tunnel, Air, Altitude, Angle, Base, Booster, Convection, Gimbal, Heat, Nozzle, Pressure, Shroud, Testing, Tunnel, Wind.

For abstract, see S 04 21.

N66-36305 **Field 20M**
CFSTI Prices HC$3.00 MF$0.75
Lockheed Missiles And Space Co., Palo Alto, Calif.
RADIANT ENERGY TRANSFER MEASUREMENTS IN AIR.
by J. C. Andrews, H. Hoshizaki, K. H. Wilson, and A. D. Wood. Sep 66, 110p NASA-CR-585
Contract NAS7-359

Descriptors: *Energy transfer, *High temperature air, *Radiant energy, *Vacuum ultraviolet, Air, Continuum, Energy, Entry, High temperature, Line, Measurement, Radiation, Superorbital, Transfer, Ultraviolet, Vacuum.

For abstract, see S 04 21.

N66-36320 **Field 20M**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Ames Research Center, Moffett Field, Calif.
APOLLO AFTERBODY HEAT TRANSFER AND PRESSURE WITH AND WITHOUT ABLATION AT M INFINITY OF 5.8 TO 8.3.
by G. Lee, and R. E. Sundell. Sep 66, 44p NASA-TN-D-3620
Contract 129-03-12-01

Descriptors: *Ablation, *Afterbody, *Apollo spacecraft, *Heat transfer, Cone, Enthalpy, Mach number, Measurement, Model, Nose, Pressure, Reynolds number, Spacecraft, Stream.

For abstract, see S 04 21.

AD-464 397 **See Field 11F**

AD-474 540 **See Field 10A**

AD-481 395 **See Field 21E**

AD-639 874 See Field 20L

AD-640 010 See Field 20D

AD-640 151 See Field 8L

AD-640 172 See Field 11F

AD-640 227 See Field 20D

AD-640 251 See Field 20D

AD-640 289 See Field 20D

AD-640 471 See Field 21I

AD-640 526 See Field 20D

NAA-SR-6322 See Field 21F

20N. WAVE PROPAGATION

AD-463 921 Field 20N
CFSTI Price: HC$7.25
Army Electronics Research and Development Activity, White Sands Missile Range, N. Mex.
TABLES OF THE MIE FORWARD LOBE,
by C. W. Querfeld, and W. A. Farone. May 65. 427p ERDA-314
Task DA-1P620901A199-05

Descriptors: (*Light, Scattering), (*Scattering, Tables), Refractive index, Absorption, Electromagnetic wave reflections, Intensity, Electromagnetic waves, Attenuation, Aerosols, Spheres.

Identifiers: MIE scattering.

Tables of the angular dependence of the perpendicular and parallel intensity factors are given for the MIE forward lobe. Real refractive indexes are used with M = 1.10, 1.15, 1.20 (0.1) 2.5, and in addition complex refractive indexes are used in which M = 2.00 (1-1K), K = 0.05, 0.25, 0.5, 1.0 and 2.0. The forward lobe is computed for scatter angles theta = 0 (1.0)30.0 for size parameters alpha = 1.0 (1.0)20.0 for each refractive index. The extinction, absorption, scattering, and backscattering efficiency factors are computed as well as the ratios, sums, and phase angles of the intensity factors. (Author)

AD-484 502 Field 20N
CFSTI Prices: HC$5.00 MF$1.00
Thomas (A. S.), Inc., Westwood, Mass.
MODULATED SURFACE WAVE ANTENNAS. NON-LINEAR PLASMA.
Final rept., 1 Dec 62-31 Oct 65,
by Abdelnour S. Thomas, and Lawrence A. Dysart Jr. May 66. 192p Rept. no. M62-10FR
Contract AF 19 (628)-2358
Proj. AF-4600
Task 460002
AFCRL-66-408

Descriptors: (*Antenna radiation patterns, *Approximation (Mathematics)), (*Electromagnetic waves, *Plasma medium), Phase modulation, Amplitude modulation, Attenuation, Plasma physics, Wave transmission, Nonlinear systems, Propagation, Mathematical models, Yagi antennas, Aluminum, Sensitivity, Diffusion, Electromagnetic fields, Radiofrequency, Electrical conductance, Ionization.

A computational technique for approximating the radiation patterns of phase modulated slow wave antennas with beams at any arbitrary angle is presented. The interrelation of the phase modulation, associated amplitude modulation, and attenuation is discussed. The technique considers the superposition of the spacial harmonics resulting from the phase modulation and the utilization of approximate expressions for the amplitude modulation based on theoretical and experimental results. The attenuation is related to the coefficients of the special harmonics. Numerical solutions to several problems dealing with nonlinear wave propagation in plasmas have been obtained. The results are displayed in the form of graphs. The problems include (1) electromagnetic wave propagation through a steady-state, inhomogeneous, isotropic nonlinear plasma slab, (2) transverse electromagnetic wave propagation through a semi-finite, inhomogeneous, time-varying, isotropic nonlinear plasma, and (3) electromagnetic wave propagation through a semi-finite, inhomogeneous, time-varying, anisotropic nonlinear plasma. (Author)

AD-639 690 Field 20N
Not available from CFSTI.
Colorado Univ., Boulder. Dept. of Electrical Engineering.
EXPERIMENTAL AND TEHORETICAL STUDIES OF PROPAGTION OF GROUND WAVES ACROSS MIXED PATHS.
Progress rept.,
by R. J. King, J. R. Wait, and S. W. Maley. 10 Mar 66. 29p Scientific-34, 500-11-5000422
Contract PRO-65-504
Proj. 4600
Task 460004
AFCRL-66-251
Availability: Published in Radio Science Journal of Research v69D n10 p1375-81 Oct 1965, Radio Science v1 n1 p111-5 Jan 1966.

Descriptors: (*Radio waves, Propagation), Model tests, Beaches, Terrain models, Electromagnetic waves.

Experimental studies of ground wave propagation along mixed paths have been conducted using laboratory models. The experimental configurations studied correspond to propagation perpendicular to a coastline, propagation oblique to a coastline, and propagation across three section paths (such as across a river or isthmus). The laboratory models were not intended to be scale models of any particular terrestrial mixed paths, but rather were used to evaluate the accuracy of approximate theoretical solutions. The agreement between theory and experiment was good for all configurations, indicating a high degree of accuracy for the theoretical solutions. (Author)

AD-639 892 Field 20N, 3B
Not available from CFSTI.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
THE SIZE OF LOW-LATITUDE IONOSPHERIC IRREGULARITIES DETERMINED FROM OBSERVATIONS OF DISCRETE SOURCES OF DIFFERENT ANGULAR DIAMETERS.
Environmental research papers, Revised ed.,
by Jules Aarons, and Donald A. Guidice. 7 Mar 66. 8p AFCRL-ERP-220, AFCRL-66-573
Proj. 5629
Revision of manuscript submitted 7 Jan 66.
Availability: Published in Journal of Geophysical Research v71 n13 p3277-80 1 Jul 1966.

Descriptors: (*Ionospheric disturbances, *Extraterrestrial radio waves), Puerto Rico, Scintillation, Ionospheric propagation, Radio signals.

The 1000 foot spherical reflector radio telescope at Arecibo, Puerto Rico was used to examine the scintillation of the power received from cosmic radio sources. Comparison of near simultaneous records show that small sources scintillation strongly while large sources scintillate only weakly, if at all. Using weak diffraction theory and measured values for the angular diameters of the sources, the autocorrelation size of the ionospheric irregularities was found to be 1.1 km. (Author)

AD-640 237 Field 20N, 20I
CFSTI Prices: HC$4.00 MF$0.75
Rydbeck Research Associates, Fjaras (Sweden).
COUPLED . WAVES IN MAGNETO-IONIC MEDIA, PART I,
by O. E. H. Rydbeck, and A. Hjalmarson. Jun 66. 124p Scientific-3
Contract AF 61 (052)-864
Proj. AF-4603
Task 460302
AFCRL-66-651-Pt-1

Descriptors: (*Magnetohydrodynamics, *Electromagnetic waves), Equations of motion, Propagation, Field theory, Sweden.

Coupled magneto-ionic equations in total fields, for arbitrary primary wave incidence, and arbitrarily varying medium parameters, are solved in terms of first order mode amplitude equations, expressed in terms of so called 'inhomogeneous' or 'homogeneous' wave numbers. For media with symmetric wave propagation properties, the first order mode amplitude equations can also be replaced by gradient coupled, second order wave equations in so called characteristic components. The gradient coupling terms can then be separated in vertical incidence, and oblique incidence components. Expressions are derived for the mode transfer reflection coefficients, and mode transmission coefficients for an arbitrary, stratified magneto-ionic medium. Several propagation cases, also with characteristic mode or z-component coupling, are discussed in the report. (Author)

AD-640 519 Field 20N
CFSTI Prices: HC$1.00 MF$0.50
Naval Scientific and Technical Intelligence Center, Washington, D. C.
SURFACE ROUGHNESS AND EFFECTIVE REFLECTION COEFFICIENT OF THE SEA IN 9Gc BAND WAVE PROPAGATION,
by Takeshi Marukawa. Jun 66. 14p NSTIC-Trans-1791
TT-66-62469
Trans. of Denki Tsushin Gakkai Zasshi (Japan), v45 n8 p1071-5 1962.

Descriptors: (*Microwaves, Propagation), (*Ocean waves, Attenuation), Roughness, Oceans, Surface properties, Japan, Reflection.

The most important factor among the radio wave propagation path constants with regard to microwaves whose path lies across the surface of the sea is the value of the effective reflection coefficient rho sub e. In the present survey propagation experiments were carried out with a 9Gc band on real sea surfaces at a distance of 3.52 Km respectively from the transmitter. Three experiments were carried out, two in winter (November, 1959 and February-March, 1961) and one in summer (August, 1959). Measurements of rho sub e by means of the antenna height pattern method, and of the size of the waves at the reflection points were carried out simultaneously. The waves were shown in wave height values, and a hydraulic gauge was employed. As a result of the experiment it became clear that the rho sub e value of the surface of the sea and its short-term variation distribution bear a close relationship to the size of the waves and the motion thereof. Thus, (1) the rho sub e value decreases rather as the size of the waves increases, (2) the variation in rho sub e increases as the waves increase, (3) as a result of the sea waves extremely short fading cycles occur. Appended is some research on determining rho sub e for a rough surface in motion such as the sea, and on the method of measuring rho sub e. (Author)

NBS-TN-339 Field 20N, 13B
CFSTI Prices: HC$0.50 MF$0.75
Environmental Science Services Administration, Boulder, Colo. Inst. for Telecommunication Sciences and Aeronomy.
OBSERVED PHASE-FRONT DISTORTION IN SIMULATED EARTH-TO-SPACE MICROWAVE TRANSMISSIONS,
by H. B. Janes, and M. C. Thompson Jr. 12 May 66. 100p
Also available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.50.

Descriptors: (*Wave transmission, *Microwave frequency), (*Radio transmission, *Phase distortion), Troposphere, Refractive index, Diurnal variations, Simulation, Antenna arrays, Radio ranges, Statistical analysis.

An experimental study was made of the time and space statistics of the phase-front distortion of microwave signals sent from a ground terminal to an elevated terminal. To isolate atmospheric errors from random motion of the upper terminal, the latter was simulated by a series of mountaintop antenna arrays. Phase-front distortion was analyzed in terms of time variations in radio range on a single path and in first and second range differences from pairs of paths. The cross-correlations of (1) range variations on adjacent paths, and (2) range difference variations on both adjoining and separated pairs of paths were investigated, including the strong dependence of correlation on the portion of the power spectrum included in the data. A diurnal pattern in the variance of 15-minute range difference samples was observed, with minimum variance in the early morning hours. This pattern was not observed in the range variances, nor were the range and range difference variances significantly correlated with refractive index, air temperature, pressure or wing speed data at the lower terminal. (Author)

N66-27936 **Field 20N**
CFSTI Prices HC$1.00 MF$0.50
Kansas Univ., Lawrence. Center For Research In Engineering Science.
OMNIDIRECTIONAL SCATTERING OF ULTRASONIC WAVES FROM ROUGH SURFACES OF KNOWN STATISTICS WITH APPLICATION TO ELECTROMAGNETIC SCATTERING.
by R. K. Moore, and B. E. Parkins. 1963, 15p
NASA-CR-75617, CRES-48-2
Grant NSG-298, Contract NSF GP-2259

Descriptors: *Electromagnetic scattering, *Scattering cross section, *Surface roughness, *Ultrasonic wave, Acoustic, Cross section, Direction, Electromagnetic, Omnidirectional, Property, Roughness, Scattering, Surface, Ultrasonic, Wave.

For abstract, see S 04 15.

N66-28484 **Field 20N**
CFSTI Prices HC$2.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
ACCURACY OF APPROXIMATE FORMULATIONS FOR NEAR-FIELD WEDGE DIFFRACTION OF A LINE SOURCE.
by R. C. Rudduck, and L. L. Tsai. 15 Mar 66, 35p
NASA-CR-75695
Grant NSG-448
Its Rept.-1691-18

Descriptors: *Antenna, *Cylindrical wave, *Wave diffraction, *Wedge, Approximation, Communications, Cylinder, Diffraction, Edge, Formulation, Geometry, Line, Source, Structural, Table, Wave.

For abstract, see S 04 16.

N66-28507 **Field 20N**
CFSTI Prices HC$2.00 MF$0.50
Alabama Univ. Research Inst., Huntsville.
CUTOFF FREQUENCIES OF ECCENTRIC WAVEGUIDES.
by N. F. Audeh, and H. Y. Yee. 1966, 30p
NASA-CR-75727
Grant NSG-381, Contract DA-01-021-AMC-14441(Z)
Submitted For Publication

Descriptors: *Boundary value problem, *Point matching method, *Waveguide, Boundary, Circular, Cross section, Cut-off, Cylinder, Eccentricity, Frequency, Matching, Method, Point, Problem, Solution, Tube, Uniform, Value.

For abstract, see S 04 16.

N66-29341 **Field 20N**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
METHODS FOR ACHIEVING TV SIGNAL DELAY USING ULTRASONIC WAVES.
Sposoby Zaderzhki Televizionnogo Signala S Ispol'zovaniyem Ul'trazvuka
by I. V. Zakharov. May 64, 15p NASA-TT-F-8885
Transl. Into English From Tekhn. Kino I Televideniya (Moscow), No. 8, 1963 P 29-35

Descriptors: *Delay line, *Television transmission, *Time delay, *Ultrasonic wave, Attenuation, Ceramic, Delay, Electric, Electron, Frame, Interval, Line, Magnetic, Recording, Shear, Signal, Storage, Television, Time, Transmission, Tube, Ultrasonic, Wave.

For abstract, see S 04 16.

N66-29449 **Field 20N**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
RESEARCH APPROACHES TO THE PROBLEM OF REENTRY COMMUNICATIONS BLACKOUT.
by P. W. Huber, and T. Sims. 1965, 33p NASA-TM-X-56839
Presented At The 3d Symp. On The Plasma Sheath, Boston, 21-23 Sep. 1965, Sponsored By Afcrl

Descriptors: *Blackout, *Blunt body, *Communication theory, *Reentry communication, Blunt, Body, Boundary, Communication, Flight, Fluid, Layer, Plasma, Propagation, Reentry, Shock, Simulation, Theory, Tunnel, Wave.

For abstract, see S 04 16.

AD-473 393 **See Field 17B**

AD-639 809 **See Field 9E**

AD-639 957 **See Field 22C**

AD-640 225 **See Field 20C**

AD-640 319 **See Field 17B**

AD-640 372 **See Field 20I**

21A. AIR-BREATHING ENGINES

N66-27031 **Field 21A**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
THE SCRAMJET.
by J. C. Evvard. 1965, 11p NASA-TM-X-56755
Presented At The 8th Ann. Missile And Space Technol. Inst., Conn. Univ., 4-5 Aug. 1965

Descriptors: *Combustion chamber, *Diffuser, *Ramjet engine, *Scramjet engine, *Supersonic combustion, Chamber, Combustion, Engine, Equation, Pressure, Ramjet, Scramjet, Stagnation, Static, Supersonic, Temperature.

For abstract, see S 04 15.

21B. COMBUSTION AND IGNITION

AD-639 878 **Field 21B, 21I**
Not available from CFSTI.
Princeton Univ., N. J.
IGNITION OF AN EVAPORATING FUEL IN A HOT, STAGNANT GAS CONTAINING AN OXIDIZER.
Revised ed.,
by C. E. Hermance, R. Shinnar, and M. Summerfield. 22 Jun 64, 12p
Contract AF 49 (638)-1267
Proj. AF-9711
Task 971101
AFOSR-66-1789
Availability: Published in AIAA Journal v3 n9 p1584-92 Sep 1965.

Descriptors: (*Solid rocket propellants, Ignition), (*Ignition, Mathematical models), (*Composite propellants, Evaporation), Solid rocket fuels, Solid rocket oxidizers, Vapors, Gases, Ignition lag, Concentration (Chemistry), Flame propagation, Thermodynamics.

Experimental evidence indicates that the ignition of a solid propellant by conventional agents occurs in the gaseous reaction zone adjacent to the propellant surface and that, in such heterogeneous systems, the gas composition, pressure, and temperature strongly influence the ignition delay. This paper, in contrast to extensive past study of ignition in homogeneous mixtures, describes some of the key theoretical properties of ignition in heterogeneous systems through similarity theory and numerical analysis of the mathematical model. Certain common simplifying assumptions and ignition criteria, valid for homogeneous systems, were found to be invalid in heterogeneous systems. In heterogeneous systems with igniter gas temperatures near E/R, the particular choice of ignition criterion affects the formula connecting the ignition delay and the chemical or physical parameters of the gas phase. Furthermore, a log-log plot of ignition delay vs concentration of gaseous oxidizer exhibits a slope that varies over a wide range of negative values; this slope is not a simple multiple of the controlling reaction order. These theoretical results require verification by critically designed experiments. (Author)

AD-639 940 **Field 21B, 21D**
CFSTI Prices: HC$2.60 MF$0.50
Instituto Nacional de Technica Aeroespacial, Madrid (Spain).
COMBUSTION OF FUEL DROPS. FORCED CONVECTION AND INTERACTION EFFECTS,
by Gregorio Millan, and Carlos S. Tarifa. 20 Sep 56, 27p
Contract AF 61 (514)-734C
Presented at the European Aeronautical Congress (2nd) Sep 25-29, 1956 Scheveningen, Netherlands.

Descriptors: (*Fuels, Combustion), (*Combustion, Drops), Fuel sprays, Spain.

A brief review was made of the theoretical and experimental results in reference to the combustion of single fuel drops in a still atmosphere. Several experimental results on the effects of forced convection and interaction in the combustion of fuel drops are given and compared to those for the case of a single drop in a still atmosphere. Analysis is made of the possible application of this experimental evidence to the combustion of sprays. (Author)

AD-639 941 **Field 21B**
CFSTI Prices: HC$3.60 MF$0.50
Imperial Coll. of Science and Technology, London (England).
FLAME STRUCTURE; EXTENSION OF OPTICAL METHODS TO FASTER FLAMES. AN EXPERIMENTAL STUDY OF BURNER STABILIZED TURBULENT FLAMES IN PREMIXED REACTANTS.
Final technical rept. on Phase D,
by M. D. Fox, and F. J. Weinberg. Nov 61, 38p
Contract AF 61 (514)-1013

Descriptors: (*Flame propagation, Turbulence), Gas flow, Fuels, Photographic analysis, Theory, Stabilization, Burning rate, Great Britain.

Current concepts of flame propagation in premixed, turbulent gas streams are examined. This leads to the conclusion that the link between theory and experiment is entirely inadequate and incapable of improvement by existing methods. A series of new methods is implemented in an attempt to short-circuit the unprofitable chain of hypothesis and experiment which has hampered the identification of dubious steps. Methods of introducing uniform turbulence at relatively slow flows and improvements in light sources allow analysis of the approach flow by photographing particles illuminated by an interrupted Tyndall beam. Three new optical deflection methods are used to give a measure of the randomness of flame-front orientation, of the time-mean structure of the flame and of the instantaneous shape of the corrugated front. It is found that this corrugated surface propagates at a velocity considerably in excess of the normal laminar burning velocity. Quantitative analysis of the frequency of 'peaks' and 'valleys' on the surface, together with comparative data from the apex of laminar flames, suggests an explanation in terms of the effects of curvature and, secondarily, of the influence of small scale turbulence. (Author)

AD-639 942 **Field 21B**
CFSTI Prices: HC$2.60 MF$0.50
Imperial Coll. of Science and Technology, London (England). Dept. of Chemical Engineering and Chemical Technology.
INFRA-RED STUDY OF FLAME STRUCTURE.
Technical rept.,
by P. Davies, and F. J. Weinberg. 12 Dec 62, 23p
Contract AF 61 (052)-146

Descriptors: (*Flames, *Infrared spectroscopy), Absorption spectrum, Instrumentation, Temperature, Carbon dioxide, Chemical reactions, Ethylenes, Great Britain.

A burner and optical systems have been developed which make it possible to traverse the structure of lean flat flames by an infra-red beam, without intervening windows, and record the absorption at various wavelengths as a function of gas temperature. It was found that: (1) a flame can be used as a stationary temperature distribution at constant pressure for the purpose of calibrating infra-red absorption, providing the species examined is an inert component and remains in equilibrium with local temperature; (2) free radicals and other unstable species are not present in lean limit flames in sufficient concentration to be detectable in flames of about 12 cm optical path; (3) the method can be used to follow the disappearance, or first appearance, of major species such as reactants, products or stable intermediates; (4) although it is possible to calibrate absorption quantitatively for the determination of species concentration under equilibrium conditions, such calibrations cannot be applied to the species while it is undergoing reaction.

AD-640 211 **Field 21B, 7D**
CFSTI Prices: HC$2.60 MF$0.50
Imperial Coll. of Science and Technology, London (England).
FLAME STRUCTURE MEASUREMENT OF COMPOSITION DISTRIBUTION. METHODS FOR THE STUDY OF HYDROGEN-BROMINE FLAME KINETICS,
Final technical rept.,
by F. Peacock, and F. J. Weinberg. Dec 59, 33p
Contract AF 61 (514)-1013

Descriptors: (*Flames, Reaction kinetics), (*Hydrogen, Flames), (*Bromine, Flames), Nitrogen, Test methods, Safety, Photographic analysis, Test equipment, Transport properties, Great Britain.

Topics include: stabilization of flat H2-Br2-N2 flames (construction materials, supply and control of reactants, the burner, products disposal and safety precautions); flame structure measurment (Br2 absorption and light source, deflection distribution measurement, absorption distribution measurement, optical system, analysis of records); interpretation and assessment of results (theory, transport coefficients calculable, effect of inexact transport data, derivation of transport data from flame structure).

AD-640 444 **Field 21B, 13B, 21D**
CFSTI Prices: HC$2.00 MF$0.50
California Univ., Berkeley. Thermal Systems Div.
OXIDES OF NITROGEN IN ENGINE EXHAUST WITH AMMONIA FUEL.
Technical rept.,
by R. Sutton, and E.. Starkman. Jun 66, 27p
TR-7, TS-66-4
Contract DA-04-200-AMC-791 (X)
Rept. on ammonia fuel.

Descriptors: (*Exhaust gases, Nitrogen compounds), (*Nitrogen compounds, Oxides), (*Ammonia, Combustion), Fuels, Combustion products, Decomposition, Reaction kinetics, Samplers, Spectrophotometers, Air pollution.

Identifiers: Nitrogen oxides.

At maximum output, more oxides of nitrogen are produced by combustion of ammonia than with hydrocarbon fuels. This is partly a result of peak power occurring at low mixtures with ammonia. Disproportionate quantities of nitrogen oxides which are encountered with ammonia at lean mixture ratios indicate a probable result of the direct production of NO in the ammonia pyrolysis scheme. (Author)

AD-640 468 **Field 21B, 21E, 21I**
CFSTI Prices: HC$3.00 MF$0.75
United Technology Center, Sunnyvale, Calif.
COMPILATION OF ABSTRACTS, 2ND AFOSR COMBINED CONTRACTORS MEETING ON COMBUSTION DYNAMICS RESEARCH, AUGUST 8-10, 1966.
Interim rept.
8 Aug 66, 82p
Contract AF 49 (638)-1557
Proj. AF-9711
Task 971101
AFOSR-66-0581

Descriptors: (*Ramjet engines, Combustion), (*Rocket propellants, *Combustion), Supersonic flow, Dynamics, Abstracts, Liquid rocket propellants, Solid rocket propellants, Symposia.

Identifiers: Scramjets.

The report consists of a collection of abstracts of the numerous research progress reports given by AFOSR contractors. These papers presented over a two-day period composed the 2nd Annual Meeting on Combustion Dynamics Research. Each paper was grouped under one of three major subject headings: Advanced Air Breathing Combustion, Liquid Propellant Rocket Combustion, or Solid Propellant Rocket Combustion. (Author)

AD-640 476 **Field 21B**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
PRESSURE DISTRIBUTION IN A VORTEX COMBUSTION CHAMBER,
by P. M. Mikhaylov, and A. N. Shtym. 8 Apr 66, 11p FTD-TT-65-1712
TT-66-62460
Unedited rough draft trans. of Politekhnicheskii Institut, Leningrad. Trudy (USSR) n232 p42-6 1964.

Descriptors: (*Combustion chambers, Pressure), Vortex generators, USSR.

Identifiers: Cyclones (Mechanical).

AD-640 501 **Field 21B**
CFSTI Prices: HC$2.00 MF$0.50
Instituto Nacional de Tecnica Aeroespacial, Madrid (Spain).
HYBRID COMBUSTION AND FLAME STRUCTURES.
Final rept. 1 Apr 65-31 Mar 66,
by Carlos Sanchez Tarifa. 31 Mar 66, 29p
Grant AF-EOAR-70-65
Proj. AF-9711
Task 971101
AFOSR-66-2102

Descriptors: (*Combustion, Flame propagation), (*Flames, Spheres), Fuels, Oxidizers, Hydrogen, Oxygen, Metals, Diffusion, Supersonic flow, Mathematical models, Spain.

Identifiers: Hybrid combustion.

The report summarizes the results obtained in a research effort accomplished on (1) hybrid combustion (flame propagation over the surface of a solid or liquid fuel in a gaseous oxidizer environment); and (2) flame structures (hydrogen-oxygen flame with a spherical symmetry and combustion of metals). A theoretical model is presented and discussed for the solution of flame propagation for the case of hybrid (solid-gas) systems based on the assumption that heating of the fuel ahead of the flame governs the flame propagation speed. Theoretical results are compared with those obtained from an experimental investigation of flame propagation along hollow cylinders of thermoplastic fuels through which a flow of oxygen circulates, and they are shown to agree reasonably well. A model is also discussed for the laminar spherical symmetrical hydrogen-oxygen diffusion flame, and analytical expressions relating the fundamental variables of the process are presented. Theoretical calculations are compared with the results obtained from an experimental investigation, and a qualitative agreement was obtained in the position of the flame front and the surface temperature. (Author)

N66-27194 **Field 21B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
THE COMBUSTION OF THREE-COMPONENT CONDENSED MIXTURES.
Goreniye Trekhkomponentnykh Kondensirovannykh Smesey
by N. N. Bakhman, and YU. A.Kondrashkov. Jun 63, 13p NASA-TT-F-8436
Transl. Into English From Zh. Fiz. Khim. (Moscow), V. 37, No. 1, 1963 P 216-219

Descriptors: *Burning process, *Combustion, *Metal particle, Analysis, Burning, Component, Condensation, Gas, Metal, Mixture, Particle, Process, Three.

For abstract, see S 04 15.

N66-29225 **Field 21B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Manned Spacecraft Center, Houston, Tex.
FLAMMABILITY DURING WEIGHTLESSNESS.
by J. H. Kimzey. May 66, 17p NASA-TM-X-58001
Presented At 12th Ann. Tech. Meeting Of The Inst. Of Environ. Sci., San Diego, Calif., 13 Apr. 1966

Descriptors: *Burning process, *Combustion, *Weightlessness, Air, Burning, Dacron, Effect, Flame, Flammability, Foam, Fuel, Gravity, Mixture, Neoprene, Nitrogen, Oxygen, Paraffin, Polyurethane, Process, Rubber, Styrene, Teflon, Zero, Zero gravity.

For abstract, see S 04 16.

PB-173 062 **Field 21B**
CFSTI Prices: HC$2.00 MF$0.50
Standard Oil Development Co., Linden, N. J. Esso Labs.
HIGH-TEMPERATURE REACTION RATES IN HYDROCARBON COMBUSTION,

by J. P. Longwell, and M. A. Weiss. Oct 54, 35p Bumblebee-221
AD-50 821
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab., Contract NOrd-9233.

Descriptors: (*Hydrocarbons, Combustion), (*Combustion, Reaction kinetics), Combustion chambers, Optimization, Combustion chamber gases, Combustion products, Jet flames, Gas flow, Heat of activation, Carbon monoxide, Oxidation, Thermodynamics, High-temperature research.

Identifiers: Bumblebee project.

Combustion was carried out inside three-inch and six-inch (inside diameter) insulated spherical reactors. The reaction space was vigorously stirred by incoming jets of homogeneous fuel-air mixture, thus giving near-homogeneous composition and temperature throughout the reactor. Blowout data were obtained for equivalence ratios from 0.4 to 2.0, pressures from one to one-eighth atmosphere absolute, and mass loadings from 0.6 to 10 grammoles of air per second per liter of reaction volume. Blowouts were also predicted by assuming the spherical reactor to be a perfectly stirred flow system, controlled by the oxygen-combustible reaction rate. Fitting the blowout data to the rate equations yielded an over-all reaction order of 1.8 and an activation energy of 42,000 calories per mole. Combustion gas samples suggest that in the final stages of hydrocarbon combustion, the oxidation of carbon monoxide is the slow, controlling step, at least for lean mixtures. The effect of heat loss from the reaction zone is to reduce the flame temperature and thus the rates of reaction and maximum space heat release.

PB-173 180 **Field 21B**
CFSTI Prices: HC$3.60
Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
LAMINAR FLAME SPEEDS OF BORON HYDRIDES AND THEIR ALKYLATED DERIVATIVES,
by W. G. Berl, D. Dembrow, and J. T. O'Donovan. Mar 60, 32p TG-315-5
Contract NOrd-7386
AD-318 405

Descriptors: (*Organoboranes, Combustion), (*Boron compounds, Hydrides), Pentaboranes, Velocity, Air, Flames.

A fuel system was designed in which homogeneous mixtures of propylpentaborane in air could be prepared and which overcame the difficulties posed by the low vapor pressure and toxicity of the fuel. Space velocities of flame kernels of propylpentaborane-air at 100 F and 160 F were measured by direct photography of the expanding flame front in a slow-moving jet at atmospheric pressure. Results were compared with predictions based on previous measurements in the pentaborane/ethylene-air system. The implications of these determinations briefly discussed. (Author)

AD-639 735 **See Field 19D**

AD-640 137 **See Field 19D**

AD-640 138 **See Field 19D**

AD-640 139 **See Field 19D**

AD-640 169 **See Field 7D**

AD-640 428 **See Field 18C**

AD-640 471 **See Field 21I**

21C. ELECTRIC PROPULSION

AD-639 979 **Field 21C**
Not available from CFSTI.
Astro-Electronics Div., Radio Corp. of America, Princeton, N. J.
ELECTRON CYCLOTRON PLASMA THRUSTOR FOR ORBIT CORRECTIVE MISSIONS,
by H. W. Hendel, and T. J. Faith Jr. 1965, 9p
AED-C-2352
Contract AF 49 (638)-1342
Proj. AF-9752
Task 975201
AFOSR-66-1094
Invited paper to meeting on Propulsion and Energetics Panel (26th), AGARD, Pisa, Italy, Sep. 1965.
Availability: Published in Proceedings of Propulsion and Energetics Panel Meeting (26th), AGARD Pisa Italy Sep 6-10 1965.

Descriptors: (*Plasma engines, *Space propulsion), (*Cyclotrons, Plasma engines), Cyclotron resonance phenomena, Thrust, Space charges, Spacecraft, Corrections, Orbital trajectories, Effectiveness, Fuel consumption.

The report contains measurements of ion kinetic energy, electron temperature and plasma-potential gradient. These measurements are in good agreement with theoretical predictions based on an ion accelerating mechanism employing a space-charge potential gradient set up by the energetic electrons produced in an electron cyclotron discharge. Electron temperatures (up to 25 ev), ion energies (35 to 150 ev), and propulsive efficiencies greater than 30 percent have been measured at 50 w. The fuel utilization is better than 50 percent. Due to the absence of cathodes or ion accelerating structures, life-times expected for the thrustor are of the order of years. Such devices have been run in the laboratory for over 1500 hrs without visible deterioration. On the basis of this measured performance, the electron cyclotron accelerator described compares favorably with other station-keeping systems for those long duration missions where thrustor life is of particular importance. (Author)

N66-27051 **Field 21C**
CFSTI Prices HC$4.00 MF$1.00
Hughes Research Labs., Malibu, Calif.
DEVELOPMENT OF LINEAR STRIP ION THRUSTORS SEMIANNUAL REPORT.
by J. R. Anderson, M. D. Benton, R. Kuberek, J. W. Pfeifer, and J. D. Smith. Jan 66, 121p
NASA-CR-54685, HRL-7927-SA
Contract NAS3-7927

Descriptors: *Feed system, *Satellite control, *Thrustor, Beam, Cesium, Cyclic, Deflection, Electrostatic, Gravity, Ion, Linear, Liquid, Strip, System, Testing, Transfer, Vibration, Zero.

For abstract, see S 04 15.

N66-28015 **Field 21C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
SOLAR-ELECTRIC PROPULSION SYSTEM PERFORMANCE FOR THE 0.1-AU SOLAR PROBE MISSION.
by W. C. Strack. Jun 66, 32p NASA-TM-X-52201
Presented At The Am. Inst. Of Aeronautics And Astronautics West Coast Aerospace Sci. Meeting, Los Angeles, 27-29 Jun. 1966

Descriptors: *Electric propulsion, *Propulsion system, *Solar power system, *Solar probe, Atlas centaur launch vehicle, Cell, Electric, Flyby, High thrust, Mission, Performance, Power, Probe, Propulsion, Saturn ib launch vehicle, Solar, System, Trajectory.

For abstract, see S 04 15.

N66-29327 **Field 21C**
CFSTI Prices HC$1.00 MF$0.50
Giannini Scientific Corp., Santa Ana, Calif. Special Projects Group.
DESIGN AND DEVELOPMENT OF A THERMOIONIC ELECTRIC THRUSTOR INTERIM REPORT.
by A. C. Ducati, E. Muehlberger, and J. P. Todd. Feb 65, 25p NASA-CR-62207
Contract NASW-968
Its Rept.-3qso25-968

Descriptors: *Ionic propulsion, *Thermoelectricity, *Thrustor, Arc, Chamber, Deuterium, Field, Gas, Ionic, Magnetic, Model, Propellant, Propulsion, Scale, Strength, Thrust, Vacuum, Wall.

For abstract, see S 04 16.

N66-35955 **Field 21C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
STATE OF DEVELOPMENT OF THE GIESSEN ION ENGINE.
Entwicklungsstand Des Giessener Ionentriebwerkes
by H. Loeb. Aug 66, 25p NASA-TT-F-10250
Transl. Into English Of A Paper Presented At The Symp. On Elec. Space Motion, Sonnenberg, West Germany, 24 Feb. 1966 P 1-13

Descriptors: *Electrostatic engine, *Ion engine, Absolute, Electrostatic, Engine, Improvement, Ion, Ionizer, Output, Performance, Power, Propulsion, Source, Specific, System, Test.

For abstract, see S 04 21.

N66-36091 **Field 21C**
CFSTI Prices HC$3.00 MF$0.75
Avco Corp., Wilmington, Mass. Research And Advanced Development Div.
ARCJET TECHNOLOGY RESEARCH AND DEVELOPMENT SECOND QUARTERLY PROGRESS REPORT, 1 SEP. - 30 NOV. 1964.
27 Dec 64, 60p NASA-CR-57452, RAD-SR-65-5
Contract NAS3-5900

Descriptors: *Arc jet, Magnetohydrodynamics, *Plasma accelerator, Accelerator, Arc, Engine, Jet, Life, Magnetoplasma, Performance, Plasma, Pulse, Testing.

For abstract, see S 04 21.

21D. FUELS

AD-639 940 **See Field 21B**

AD-640 444 **See Field 21B**

21E. JET AND GAS TURBINE ENGINES

AD-462 483 **Field 21E**
CFSTI Price: HC$6.60
Virginia Univ., Charlottesville.
PROJECT SQUID.
Semi-annual progress rept., 1 Oct 64-31 Mar 65. 1 Apr 65, 67p
Contract Nonr-3623 (00)
Proj. NR-098-038
See also AD-435 879 and AD-473 565.

Descriptors: (*Combustion, Solid rocket propellants), (*Jet propulsion, Scientific research), (*Plasma medium, Turbulence), (*Supersonic flow, Separation), (*Gas ionization, Reaction kinetics), Gas flow, Shock tubes, Plasma physics, Gases, Mixtures, Molecular beams, Inelastic scattering, Argon, Transport properties, Thermodynamics, Statistical mechanics, High-pressure research, High-temperature research, Magnetohydrodynamics,

Band spectrum, Free radicals, Magnesium, Vapors, Oxygen, Heat of activation, Magnesium compounds, Oxides, Methane, Ionization, Ammonia, Deuterated compounds, Germanium, Hydrogen, Beryllium.

Identifiers: Squid project, Activation energy, Magnesium oxides.

Reports of progress during the past 6 months on 13 research programs comprising project squid are presented. The research programs fall into the areas of fluid mechanics, transport and transfer processes, chemical kinetics, and combustion phenomena. (Author)

AD-472 771 **Field 21E**
CFSTI Prices: HC$3.00 MF$0.75
Systems Engineering Group, Research and Technology Div., Wright-Patterson AFB, Ohio.
SPECTROMETRIC OIL ANALYSIS FOR THE DETECTION OF INCIPIENT TURBOJET ENGINE FAILURES.
Final rept. Jul 63-Oct 64,
by Allan Bond, and Don C. Kittinger. Jul 65, 61p
SEG-TR-65-37
Proj. AF-3147
Task 314705

Descriptors: (*Turbojet engines, Failure (Mechanics)), (*Airplane engine oil, Spectroscopy), Maintenance, Maintenance equipment, Monitors, Detection, Sampling, Aviation safety, Costs, Programming (Computers), Digital computers, Contamination, Effectiveness, Impurities, Chemical analysis, Cost effectiveness.

The objective was to investigate (with particular reference to military turbojet engines) the technical validity of the spectrometric oil analysis approach to the identification of abnormal engine wear and impending engine failure. Program procedure called for the routine extraction of engine oil samples from aircraft at various bases and the mailing of these samples to the NAS Laboratory at Pensacola, Florida for analysis. Evaluation has been concentrated on a sixteen month period from July 1963 through October 1964 when the laboratory analyzed over 7000 oil samples and prescribed engine maintenance as thought necessary from analysis results. To assess validity of the spectrometric technique, findings of maintenance actions directed by the laboratory were monitored by SEG. The task has shown that a sound technical foundation exists for the spectrometric technique. (Author)

AD-473 565 **Field 21E**
CFSTI Prices: HC$3.00 MF$0.75
Virginia Univ., Charlottesville.
PROJECT SQUID.
Semi-annual progress rept., 1 Apr-30 Sep 65,
by J. Fay, J. Fenn, T. H. Field, A. Fontijn, and J. L. Franklin. 1 Oct 65, 71p
Contract Nonr-3623 (00)
Proj. NR-098 038
See also AD-435 879 and AD-462 483.

Descriptors: (*Jet propulsion, Solid rocket propellants), (*Combustion, Solid rocket propellants), (*Plasma medium, Turbulence), (*Supersonic flow, Separation), (*Gas ionization, Reaction kinetics), Shock waves, Velocity, Boundary layer, Mixtures, Ions, Atoms, Molecules, Particles, Thermodynamics, Transport properties, Electric discharges, Measurement, Gas flow, Aluminum, Beryllium.

Identifiers: SQUID project.

Reports of progress during the past 6 months on 13 research programs comprising Project SQUID are presented. The research programs fall into the areas of Fluid Mechanics, Transport and Transfer Processes, Chemical Kinetics, and Combustion Phenomena. (Author)

AD-475 424 **Field 21E, 20D**
CFSTI Prices: HC$2.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
SYSTEMATIC ANALYSIS OF SOME RESULTS OBTAINED FROM AERODYNAMIC TESTING OF TWO-DIMENSIONAL TURBINE STAGES AT LOW SPEED,
by Chang Kuo-fan. 18 Oct 65, 39p FTD-TT-64-1000
TT-66-62020
Edited trans. of Chi Hsieh Kung Ch'eng Hsueh Pao (Chinese People's Republic) v22 n3 pp 36-56, 1963.

Descriptors: (*Gas turbines, Two-dimensional flow), Cascade structures, Design, Configuration, Leading edge, Curved profiles, Thickness, Subsonic characteristics, Reynolds number, Turbulence, Performance (Engineering), Velocity, Distribution, Selection, China, Czechoslovakia, Gas turbine blades.

Some turbine-cascade testing results obtained from experimental research on low speed two-dimensional stages were analyzed and compared systematically. The following problems were investigated; physical interpretation of the influence of the design characteristics of the two-dimensional turbine stage (Air-stream turning angle stage reaction) and its geometric parameters (relative pitch, stagger angle, relative leading edge radius maximum profile thickness ratio, etc.) on the principal aerodynamic characteristics (profile loss coefficient and exit flow angle), also comparison of the above results with corresponding data published in the literature. On this basis, certain qualitative relationships are verified and concrete data is obtained. In the meantime, certain concrete principles and data for the preliminary design and approximate calculation of characteristics for turbine stage profiles are developed. (Author)

AD-481 395 **Field 21E, 20M**
CFSTI Prices: HC$3.00 MF$0.75
Curtiss-Wright Corp., Quehanna, Pa.
EXPERIMENTAL INVESTIGATION OF THE COOLING CHARACTERISTICS OF TRANSPIRATION AIR-COOLED TURBINE BLADES IN A HIGH TEMPERATURE GAS CASCADE.
Final rept.,
by Ronald Lang. 28 Nov 58, 93p CWR-300-39
Contract NOas-56-495-c
See also AD-481 393.

Descriptors: (*Gas turbine blades, *Sweat cooling), Air cooled, Cascade structures, Heat transfer, Turbine stators, Reynolds number, Gas flow, Turbojet engines, Rotor blades (Turbomachinery), Effectiveness, Temperature, Bleed systems, Porous materials, Pressure, Permeability, Porous metals, Coolants, Performance (Engineering), Experimental data.

An experimental investigation was conducted on a transpiration air cooled stator cascade to evaluate the heat transfer characteristics, to observe the temperature patterns, and to verify the existing transpiration cooling theory for hot gas streams ranging in temperature from 1600 to 2050 F. A total of 49 hours and 55 minutes of cascade testing were logged. Hot gas Reynolds numbers computed at ten span-wise positions on the blade varied between 7800 on the pressure side near the leading edge and 288,000 at the convex side just upstream of the trailing edge. Hot gas weight flows of 2.46 lb/sec and 1.64 lb/sec were directed at the cascade section. A comprehensive analysis of the data accumulated along with detailed descriptions of the test facility, the component test hardware, and the problems associated with instrumentation is presented.

AD-639 982 **Field 21E**
CFSTI Prices: HC$10.80 MF$3.00
General Electric Co., Cincinnati, Ohio. Advanced Technology and Demonstrator Programs Dept.
HIGH-SPEED WIND TUNNEL TESTS OF A HIGH BYPASS LIFT/CRUISE FAN PROPULSION SYSTEM.
Final rept., Mar 63-Jan 66,
by Eugene G. Smith. Jul 66, 778p Rept. no. R66FPD161
Contract DA-44-177-AMC-10 (T)
Proj. DA-1D131201D159
USAAVLABS-TR-66-40

Descriptors: (*Propulsion, Fans), Engine nacelles, Wind tunnels, Thermodynamics, Aerodynamic characteristics, Lift, Turbines, Aircraft.

An investigation was carried out to determine the aerothermodynamic characteristics of a family of close-coupled lift/cruise fan installations. The lift/cruise installation consisted of the General Electric X376 tip turbine fan system driven by a T58-6A core engine acting as a gas producer, and a nacelle system comprised of a family of interchangeable inlet and exhaust systems. The characteristics were obtained for Mach numbers between 0.0 and 0.85. The test results showed that the low-speed drag coefficient of the nacelle system (including core engine) was between 0.04 and 0.08, depending on the nacelle geometry and the inlet mass flow ratio. Drag rise or drag divergence occurred at lower than predicted test Mach numbers because of premature critical flow in the region of a nacelle fairing between fan and engine. The axisymmetric regions of the fan nacelle and the core engine nacelle demonstrated critical Mach number performance as obtained using standard nacelle design procedures. The test results provide criteria for redesign of the fairing regions to eliminate the premature critical flow conditions in this region of the installation. Analysis and recommendations for fairing and inlet lip design changes are provided; small scale unpowered model tests would be needed to verify the analysis. (Author)

AD-640 070 **Field 21E, 13J**
CFSTI Prices: HC$5.00 MF$1.25
Catholic Univ., Washington, D. C. Dept. of Mechanical Engineering.
TESTING OF GAS TURBINE HIGH VELOCITY DUCT SYSTEMS.
Fi l rept. 1 Sep-31 Aug 66,
by William J. Kelnhofer, and Russell A. Smith.
31 Aug 66, 200p
Contract NObs-92176

Descriptors: (*Gas turbines, Ducts), (*Ducts, Turbine parts), Tests, Velocity, Ship turbines, Incompressible flow, Compressible flow, Design, Subsonic flow.

A study is made of incompressible and subsonic compressible (up to Mach number = 0.4) flow losses associated with intake and exhaust ducting components and systems for shipboard boiler-turbine and gas turbine engines. An extensive literature survey is made to determine what design data are available and the areas where more design data are needed. A mathematical model covering one-dimensional diabatic and adiabatic gas flow is presented. Good comparisons are obtained between the model and laboratory tests for circular and square cross-sectional ducts with Mach numbers up to 0.4. Based on additional tests, new design data are presented in three areas: Reynolds number effects on short-radius elbow pressure loss coefficients, subsonic Mach number at which compressibility effects on the elbow pressure loss coefficient begins, and how the position of an elbow in a system affects its pressure loss coefficient. Using data found in the literature and the new data mentioned above, a design data sheet for shipboard engine ducting systems is evolved. A good comparison is obtained between losses calculated using the design data sheet and a limited number of model systems tested in the laboratory. (Author)

AD-640 288 **Field 21E**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.

VAPORIZING COMBUSTION CHAMBER OF GAS-TURBINE ENGINE AND FEATURES OF ITS OPERATION,
by E. P. Fedorov, and Yu. I. Shalman. 13 Apr 66, 18p FTD-TT-65-1855
TT-66-62430
Unedited rough draft trans. of Avtomobilnaya Promyshlennost (USSR), v30 n5 p42-5 1964.

Descriptors: (*Gas turbines, *Combustion chambers), Vaporization, Operation, Design, USSR.

N66-35957 **Field 21E**
CFSTI Prices HC$2.50 MF$0.75
National Aeronautics And Space Administration, Washington, D. C.
PROSPECTS OF PISTON AND TURBOJET ENGINES FOR LIGHT AIRCRAFT.
Zukunftsaussichten Der Kolbenmotoren Und Turbotriebwerke Fuer Leichtflugzeuge
by L. V. Bonin, and K. Grasmann. Aug 66, 64p NASA-TT-F-10252
Transl. Into English Of A Paper Presented At The 6th European Aeron. Congr., Munich, 1-4 Sep. 1965

Descriptors: *By-pass engine, *Light aircraft, *Piston engine, *Turbojet engine, Aircraft, By-pass, Engine, Light, Piston, Ratio, Supercharger, Turbojet.

For abstract, see S 04 21.

N66-36416 **Field 21E**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
PRELIMINARY EVALUATION OF FLIGHT-WEIGHT XRJ47-W-5 RAM-JET ENGINE AT A MACH NUMBER OF 2.75.
by D. H. Reilly, and H. J. Welna. 1955, 43p NACA-RM-E55G22

Descriptors: *Aerodynamic characteristics, *Free jet, *Ramjet engine, *Test chamber, Aerodynamic, Altitude, Burner, Chamber, Characteristics, Combustion, Cooling, Engine, Free, Ignition, Jet, Liner, Navaho missile, Performance, Propulsion, Ramjet, Shell, Test.

For abstract, see S 04 21.

AD-463 207 **See Field 22B**

AD-640 291 **See Field 10A**

AD-640 293 **See Field 13G**

AD-640 468 **See Field 21B**

21F. NUCLEAR PROPULSION

NAA-SR-11944 **Field 21F, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
DIGITAL COMPUTER STUDY OF THE DYNAMICS OF THE COMBINED ROTATING UNIT SHAFT-BEARING SYSTEM,
by J. M. Howard. 15 Jul 66, 38p
Contract AT (11-1)-GEN-8

Descriptors: (*Dynamics, *Shafts), Nuclear propulsion.

For abstract, see N 20 20.

NAA-SR-6322 **Field 21F, 20M, 18I, 18N**
CFSTI Prices: HC$3.00 MF$0.75
Atomics International, Canoga Park, Calif.
MERCURY RANKINE PROGRAM (SNAP 2), BOILER CONDITIONING PHASE I RESULTS.
Topical rept. no. 30,
by Alfred Koestel. 23 Jun 66, 82p
Contract AT (11-1)-GEN-8
Pred in cooperation with TRW Equipment Labs., Cleveland, Ohio.

Descriptors: (*Boilers, Tests).

For abstract, see N 20 19.

N66-35798 **Field 21F**
CFSTI Prices HC$2.00 MF$0.50
General Electric Co., Philadelphia, Pa. Missile And Space Div.
STUDY OF LOW ACCELERATION SPACE TRANSPORTATION SYSTEMS. VOLUME I - SUMMARY PHASE II STUDY REPORT.
by H. Brown, and G. L. Coates. 15 Jul 66, 45p NASA-CR-77657
Contract NAS8-11423
Its Doc.-66sd2026

Descriptors: *Electric propulsion, *Mars spacecraft, *Nuclear rocket, Acceleration, Analysis, Design, Electric, Feasibility, Low, Manned, Mars (planet), Mission, Module, Nuclear, Payload, Performance, Plant, Power, Propulsion, Reliability, Rocket, Solar, Spacecraft, System, Vehicle.

For abstract, see S 04 21.

PB-173 348 **Field 21F, 13J, 18M**
CFSTI Prices: HC$3.00 MF$0.75
NUS Corp., Washington, D. C.
NUCLEAR CAPITAL COSTS AND COST TRENDS IN MARITIME APPLICATIONS.
Summary rept.,
by D. L. Couchman, L. R. Pletke, and C. B. Woodhall. Oct 66, 72p NUS-278A
Contract P1-MA66-492

Descriptors: (*Costs, *Pressurized water reactors), (*Marine nuclear propulsion, Costs), Installation, Scheduling, Procurement, Test methods.

The report provides detailed data concerning the direct capital costs, installation costs, schedules, and scope of supply for procurement and testing of three currently offered pressurized water reactors which could be installed as the steam generators for ship propulsion plants with operations commencing in 1970. The direct costs of the first 70,000 to 80,000 SHP pressurized water nuclear steam generating system installed and tested in a merchant ship will be between $8,700,000 and $9,600,000. These costs exclude nonrepetitive design, engineering development, and the power conversion system. Two of the proposed plants studied generally reflect current and conservative nuclear technology and can be committed directly to ship application with reasonable uncertainties and risks. The third plant incorporates a developmental feature which involves considerably higher risk in application for multiple ship procurement under commercial requirements of fixed price, exacting schedule, and guaranteed performance. The requirements of reactor procurement, construction, and installation will strongly influence ship construction schedules with a minimum period between contract initiation and first ship delivery of 45 to 48 months. Subsequent ships could be delivered at 4 month intervals. Long leadtime procurement of reactor components is the principal controlling influence on ship delivery.

N66-35875 **See Field 8G**

21H. ROCKET MOTORS AND ENGINES

N66-27047 **Field 21H**
CFSTI Prices HC$6.00 MF$1.25
Dow Chemical Co., Midland, Mich.
STUDY TO DETERMINE AN IMPROVED METHOD FOR APOLLO PROPELLANT SYSTEM DECONTAMINATION AND PROPELLANT TANK DRYING, PHASE I INTERIM REPORT.
28 Apr 66, 214p NASA-CR-65371
Contract NAS9-4605

Descriptors: *Apollo project, *Decontamination, *Propulsion system, *Rocket propellant tank, Compatibility, Diffusion, Drying, Effect, Elastomer, Flush, Impurity, Propellant, Propulsion, Purification, Rate, Removal, Rocket, Solvent, System, Tank, Temperature.

For abstract, see S 04 15.

N66-27234 **Field 21H**
CFSTI Prices HC$3.00 MF$0.75
Aerojet-general Corp., Sacramento, Calif. Liquid Rocket Operations.
THE MECHANICAL DESIGN OF A TWO-STAGE IMPULSE TURBINE FOR THE LIQUID HYDROGEN TURBOPUMP OF THE M-1 ENGINE.
by T. W. Reynolds. 30 May 66, 79p NASA-CR-54821, AGC-8800-58
Contract NAS3-2555

Descriptors: *Fuel pump, *Liquid hydrogen, *M- 1 rocket engine, *Turbopump, *Two-stage turbine, Design, Engine, Fuel, Hydrogen, Impulse, Liquid, Mechanical, Propellant, Pump, Rocket, Stage, Turbine, Two.

For abstract, see S 04 15.

N66-27739 **Field 21H**
CFSTI Prices HC$3.00 MF$0.75
Aerojet-general Corp., Sacramento, Calif. Liquid Rocket Operations.
DEVELOPMENT OF LO2/LH2 GAS GENERATORS FOR THE M-1 ENGINE.
by J. I. Ito. 1 Jun 66, 88p NASA-CR-54812, AGC-8800-59
Contract NAS3-2555

Descriptors: *Gas generator, *Hydrogen fuel, *Liquid oxygen (lox), *M- 1 rocket engine, Combustion, Efficiency, Fuel, Gas, Generator, Hydrogen, Injection, Instability, Liquid, Lox, Oxidizer, Oxygen, Rocket engine.

For abstract, see S 04 15.

N66-27746 **Field 21H**
CFSTI Prices HC$3.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
DEVELOPMENT OF THE POST-INJECTION PROPULSION SYSTEM FOR THE MARINER C SPACECRAFT.
by T. A. Groudle, J. H. Kelley, and B. W. Schmitz. 1 Apr 66, 53p NASA-CR-75553, JPL-TR-32-830
Contract NAS7-100

Descriptors: *Hydrazine, *Monopropellant, *Propulsion system, Anhydrous, Catalyst, Fuel, Gas, Ignition, Injection, Mariner c spacecraft, Nitrogen, Post, Pressure, Propulsion, Rocket engine, System, Tetroxide, Valve.

For abstract, see S 04 15.

N66-28542 **Field 21H**
CFSTI Prices HC$3.00 MF$0.50
Aerojet-general Corp., Sacramento, Calif. Liquid Rocket Operations.
ANALYTICAL AND EXPERIMENTAL VIBRATION ANALYSIS OF THE TURBINE BUCKETS FOR THE M-1 LIQUID OXYGEN TURBOPUMP.
by T. Chinn, and L. K. Severud. 1965, 59p NASA-CR-54830, AGC-8800-74
Contract NAS3-2555

Descriptors: *Structural vibration, *Turbopump, *Vibration measurement, Blade, Frequency, Liquid, Measurement, Oxygen, Resonant, Second, Shaft, Speed, Stage, Vibration.

For abstract, see S 04 16.

N66-28545 **Field 21H**
CFSTI Prices HC$6.00 MF$1.50
Itek Corp., Palo Alto, Calif. Vidya Div.
ANALYTICAL AND EXPERIMENTAL STUDY OF ABLATION MATERIAL FOR ROCKET ENGINE APPLICATION FINAL REPORT.
by D. T. Flood, R. M. Kendall, and R. A. Rindal. 15 May 66, 287p NASA-CR-54757, VIDYA-201
Contract NAS7-218

Descriptors: *Ablating material, *Liquid propellant rocket engine, *Thermal insulation, Ablation, Arc, Chemical, Composition, Computer, Generator, Liquid, Material, Performance, Plasma, Program, Propellant, Rocket engine, Simulation.

For abstract, see S 04 16.

N66-29070 **Field 21H**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PREDICTION OF PROPELLANT TANK PRESSURIZATION REQUIREMENTS BY DIMENSIONAL ANALYSIS.
by M. E. Nein, and J. F. Thompson. Jun 66, 21p NASA-TN-D-3451

Descriptors: *Cylindrical tank, *Dimensional analysis, *Liquid propellant, *Pressurization, *Propellant tank, *Spherical tank, Analysis, Cylinder, Dimensional, Equation, Gas, General, Liquid, Mass, Pressure, Propellant, Requirement, Spherical, Tank.

For abstract, see S 04 16.

N66-29344 **Field 21H**
CFSTI Prices HC$3.00 MF$0.75
General Electric Co., Cincinnati, Ohio. Space Power And Propulsion Section.
ANALYTICAL METHODS FOR RESISTANCE JET DESIGN SUPPLEMENTARY REPORT NO. 1.
by R. Viventi. Aug 64, 67p NASA-CR-62114, R64SD3008
Contract NAS5-9013

Descriptors: *Jet thrust, *Satellite attitude control, Analysis, Attitude, Control, Design, Expansion, Filament, Flow, Heat, Jet, Length, Nozzle, Passage, Radiation, Resistance, Satellite, Shielding, Thermodynamic, Thrust.

For abstract, see S 04 16.

N66-29448 **Field 21H**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
NON-CHEMICAL PROPULSION.
by J. C. Evvard. 1965, 65p NASA-TM-X-56753 Presented At The 8th Ann. Missile And Space Technol. Inst., Storrs, Conn., 4-5 Aug. 1965

Descriptors: *Electric propulsion, *Nuclear rocket, *Propulsion system, Accelerator, Concept, Electric, Isotope, Kiwi reactor, Nerva, Nuclear, Orion, Photon, Propulsion, Radio, Rocket, System, Thermonuclear.

For abstract, see S 04 16.

N66-29471 **Field 21H**
CFSTI Prices HC$4.00 MF$0.75
Aerojet-general Corp., Azusa, Calif.
STUDY OF PRESSURIZATION SYSTEMS FOR LIQUID PROPULSION ROCKET ENGINES FINAL REPORT, 19 APR. 1961 - 15 SEP. 1962.
by F. W. Childs, T. R. Horowitz, W. Jenisch Jr, and B. Sugarman. 15 Sep 62, 120p NASA-CR-52780
Contract NAS5-1108
Its Rept.-2335

Descriptors: *Liquid propellant, *Pressurization, *Space mission, Analysis, Combustion, Cryogenic, Design, Gas, Gravity, Landing, Liquid, Lunar, Mission, Orbit, Planetary, Propellant, Requirement, Rocket engine, Selection, Space, Specific, Storage, System.

For abstract, see S 04 16.

N66-29508 **Field 21H**
CFSTI Prices HC$1.00 MF$0.50
General Dynamics/convair, San Diego, Calif.
ZERO- G REPORT, SETTLING OUTFLOW TEST.
by T. W. Ohanlon. 25 May 62, 20p NASA-CR-75925, GD/C-55D-859-5

Descriptors: *Centaur vehicle, *Hydrogen fuel, *Liquid sloshing, Acceleration, Bulkhead, Chill, Field, Froude number, Fuel, Hydrogen, Liquid, Outflux, Scaling, Settling, Sloshing, Solvent, Turbulence.

For abstract, see S 04 16.

SC-CR-66-2045 **Field 21H**
CFSTI Prices: HC$2.00 MF$0.50
TRW Systems, Redondo Beach, Calif.
BOOSTER ROCKET ALTITUDE ABORT PROGRAM.
Quarterly progress rept. no. 3, Jan 4-Apr 4 66, by R. S. Ottinger, and L. J. Van Nice. 4 Apr 66, 32p
Contract AT (29-1)-789

Descriptors: (*Abort, *Booster motors).

For abstract, see N 20 20.

AD-468 828 **See Field 11B**

21I. ROCKET PROPELLANTS

AD-466 039 **Field 21I**
CFSTI Prices: HC$4.60 MF$0.50
Columbia Univ., New York. Dept. of Civil Engineering and Engineering Mechanics.
VISCOELASTIC BEHAVIOR OF A FILLED ELASTOMER IN REVERSED TORSION.
by B. Albrecht, and A. M. Freudenthal. May 65, 50p Technical rept., TR-27
Contract Nonr-266 (78)
Proj. NR-064-446

Descriptors: (*Isocyanate plastics, Synthetic rubber), Solid rocket propellants, Viscoelasticity, Torque, Potassium compounds, Chlorides, Aluminum, Powders, Tests, Shear stresses, Temperature, Goniometers, Oscillation, Elasticity.

The mechanical behavior of polyurethane rubber filled with granular potassium chloride was investigated by subjecting tubular specimens to oscillatory torsion. The response of the material was studied to variation of frequency and amplitude of the imposed strain as well as to variation of the temperature. Beside the measurement of the storage and loss moduli, the normal forces are observed and the second order moduli, the cross-elasticity and the cross-viscosity moduli are evaluated.

AD-640 084 **Field 21I, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
KINETICS OF DECOMPOSITION OF AMMONIUM PERCHLORATE.
Interim rept.,
by W. A. Rosser, S. H. Inami, and H. Wise. 29 Sep 66, 36p PU-3573
Contract Nonr-3415 (00)
Proj. NR-092-507
See also AD-639 222.

Descriptors: (*Ammonium compounds, *Perchlorates), (*Decomposition, *Solid rocket oxidizers), Reaction kinetics, Catalysts.

Identifiers: Ammonium perchlorate.

The decomposition of NH_4ClO_4 and of NH_4ClO_4-copper chromite mixtures has been studied by isothermal and adiabatic methods. Isothermal experiments resulted in identification of the reaction products and provided kinetic details. Adiabatic experiments provided a description of the rate of decomposition in a mathematical form adaptable to the analysis of combustion phenomena involving NH_4ClO_4. Reaction mechanisms for both uncatalyzed and catalyzed decomposition are proposed. (Author)

AD-640 471 **Field 21I, 20M, 7D, 21B K**
CFSTI Prices: HC$1.00 MF$0.50
Aeronutronic Div., Philco Corp., Newport Beach, Calif.
THERMODYNAMIC PROPERTIES OF PROPELLANT COMBUSTION PRODUCTS.
Quarterly letter rept. no. 3, 1 Jan-31 Mar 66, by N. D. Potter. 31 Mar 66, 9p QLR-66-4
Contract AF 49 (638)-1577, ARPA Order-317
Proj. AF-9713
Task 971302
AFOSR-66-1367
See also AD-630 634.

Descriptors: (*Combustion products, Thermodynamics), (*Solid rocket propellants, Combustion products), Enthalpy, Entropy, Heat of vaporization, Lithium, Aluminum compounds, Carbides, Decomposition, Mass spectroscopy, Molecular beams, Modulation.

Identifiers: Aluminum carbide.

The objective of the program is to provide thermodynamic data for species which are potentially important combustion products of advanced chemical rockets and for related species. Enthalpy and entropy data are obtained from equilibrium measurements made by torsion-free evaporation and torsion-effusion techniques and by high temperature mass spectrometry. Vapor pressure data for lithium were obtained and, from these measurements the heat of vaporization of lithium was found to be 38.3 plus or minus .4 Kcal/mole. The beam modulation modification for the mass spectrometer was found to operate very well.

N66-27181 **Field 21I**
CFSTI Prices HC$4.00 MF$0.75
Atlantic Research Corp., Alexandria, Va.
STUDY OF PROPELLANT VALVE LEAKAGE IN A VACUUM PHASE II REPORT, 14 JAN. - 7 MAR. 1966.
by J. P. Copeland, R. D. Gift, J. W. Miller, J. A. Simmons, and J. M. Spurlock. 6 May 66, 112p NASA-CR-65363
Contract NAS9-4494

Descriptors: *Aerozine, *Fuel valve, *Leakage, *Propellant transfer, Characteristics, Environment, Flow, Freezing, Fuel, Injector, Manifold, Pressure, Propellant, Rate, Simulation, Temperature, Transfer, Vacuum, Valve.

For abstract, see S 04 15.

N66-27229 **Field 21I**
CFSTI Prices HC$7.51 MF$2.25
General Dynamics/convair, San Diego, Calif.
ATMOSPHERIC DIFFUSION OF FLUORINE FROM SPILLS OF FLUORINE-OXYGEN MIXTURES SUMMARY REPORT, 5 MAR. 1965 - 31 JAN. 1966.
10 May 66, 451p NASA-CR-54926, GDC-DDB66-001
Contract NAS3-3245

Descriptors: *Atmospheric diffusion, *Fluorine-liquid oxygen (flox), *Gaseous diffusion, Atmospheric, Diffusion, Dilution, Fluoride, Fluorine, Gaseous, Hydrogen, Liquid,

Mixture, Oxidizer, Oxygen, Plume, Sampler, Spill, Tracer, Trajectory.

For abstract, see S 04 15.

N66-29332 **Field 21I**
CFSTI Prices HC$1.00 MF$0.50
Stanford Univ., Calif. Electron Devices Lab.
DC STATES OF PLASMA DIODES QUARTERLY STATUS REPORT NO. 12, 1 JAN. - 1 APR. 1965.
1965, 18p NASA-CR-62729
Grant NSG-299-63

Descriptors: *Cesium diode, *Computer program, *Direct current (dc), *Space charge, Charge, Computer, Dc, Distribution, Electron, Equation, Negative, Parallel, Plane, Plasma, Potential, Program, Slope, Space, Stationary, Voltage.

For abstract, see S 04 16.

N66-29454 **Field 21I**
CFSTI Prices HC$1.00 MF$0.50
Bureau Of Mines, Pittsburgh, Pa. Explosives Research Center.
HYDROGEN SAFETY PROGRESS REPORT NO. 7 1 JUL. - 30 SEP. 1965.
by J. Grumer, E. L. Litchfield, A. Strasser, and R. A. Van meter. Oct 65, 21p NASA-CR-75387
Contract SNC-21

Descriptors: *Convection, *Detector, *Diffusion, *Performance characteristics, *Sampling device, Analyzer, Combustion, Concentration, Console, Device, Gas, Helium, Hydrogen, Performance, Plume, Response, Safety, Sampling.

For abstract, see S 04 16.

N66-35790 **Field 21I**
CFSTI Prices HC$3.00 MF$0.75
Princeton Univ., N. J. Guggenheim Labs. For The Aerospace Propulsion
NONLINEAR ASPECTS OF COMBUSTION INSTABILITY IN LIQUID PROPELLANT ROCKET MOTORS SIXTH YEARLY PROGRESS REPORT, 1 JUN. 1965 - 31 MAY 1966.
by D. T. Harrje, and W. A. Sirignano. 1 Jun 66, 95p NASA-CR-77672
Contract NASR-217
Its Rept.-553-f

Descriptors: *Combustion instability, *Liquid propellant rocket engine, *Shock wave, Combustion, Distribution, Drop, Experiment, Instability, Liquid, Longitudinal, Mathematics, Nonlinear, Process, Propellant, Rocket engine, Shock, Theory, Transverse, Wave.

For abstract, see S 04 21.

N66-35960 **Field 21I**
CFSTI Prices HC$1.00 MF$0.20
United Aircraft Corp., East Hartford, Conn. Research Labs.
ANALYTICAL STUDY OF CATALYTIC REACTORS FOR HYDRAZINE DECOMPOSITION QUARTERLY PROGRESS REPORT NO. 1, 15 APR. - 14 JUL. 1966.
by A. S. Kesten. Jul 66, 20p NASA-CR-77763, E910461-3
Contract NAS7-458

Descriptors: *Catalyst, *Hydrazine, *Propellant decomposition, Chemical, Decomposition, Equation, Mathematics, Model, Numerical, Particle, Propellant, Reactor, Solution.

For abstract, see S 04 21.

PB-170 990 **Field 21I, 19A**
CFSTI Prices: HC$2.60 MF$0.50
Naval Ordnance Test Station, China Lake, Calif.
PHYSICAL INSTABILITY OF DOUBLE-BASE PROPELLANTS. PART I. VAPOR PRESSURE OF BALLISTITE,
by Fred M. Ernsberger, John G. Wyllie, and Allen L. Olsen. 28 Sep 49, 22p NAVORD-1184-Pt-I, NOTS-240
ATI-76538

Descriptors: (*Ballistite, Vapor pressure), (*Propellants, Stability), Nitroglycerin, Toluenes, Organic nitrogen compounds, Chemical analysis.

Identifiers: Nitrotoluenes.

The report describes measurements of the vapor pressure of JPN and H-9 ballistite between 35 and 50C. Measurements were made incidentally of the vapor pressures of nitroglycerin, ethyl phthalate, ethyl centralite, and 2,4-dinitrotoluene. The Knudsen method was used. The vapor was analyzed chemically to permit separation of the observed total vapor pressure into the partial pressures of the vapor components. An interpretation of the data is made in terms of solvent-polymer interaction. (Author)

AD-639 878 **See Field 21B**

AD-640 385 **See Field 7D**

AD-640 405 **See Field 7D**

AD-640 468 **See Field 21B**

22. SPACE TECHNOLOGY

N66-35653 **Field 22-**
CFSTI Prices HC$3.75 MF$1.75
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
SPACE PROGRAMS SUMMARY NO. 37-39, VOLUME IV FOR THE PERIOD APRIL 1, 1966 TO MAY 31, 1966. SUPPORTING RESEARCH AND ADVANCED DEVELOPMENT.
by F. M. Sturms Jr. 30 Jun 66, 288p NASA-CR-77673, JPL-SPS-37-39, VOL. IV
Contract NAS7-100

Descriptors: *Aerospace technology, *Nasa program, *Space science, Aerospace, Ceramic, Coding, Control, Data, Development, Element, Equation, Germanium, Helium, Interaction, Metal, Motion, Particle, Polymer, Power, Processing, Propellant, Property, Research, Satellite, Science, Space, Spectroscopy, Technology, Thermal.

For abstract, see S 04 21.

22A. ASTRONAUTICS

AD-640 323 **Field 22A**
CFSTI Prices: HC$2.00 MF$0.50
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
CORPUSCULAR RADIATION ENVIRONMENT OF A LOW-ALTITUDE, POLAR-ORBITING EARTH SATELLITE-A BRIEF SUMMARY.
Air Force Surveys in Geophysics,
by V. G. Smalley, D. F. Smart, and R. C. Filz. Aug 66, 40p AFCRL-AFSG-185, AFCRL-66-540
Proj. AF-8600
Task 860006

Descriptors: (*Satellites (Artificial), Radiation hazards), (*Cosmic rays, Radiation hazards), (*Van Allen radiation belt, Radiation hazards), Space environmental conditions, Solar radiation, Polar orbit trajectories, Reviews.

The report summarizes the most recent determinations of particulate fluxes, flux rates, and energies for geomagnetically trapped radiation, galactic cosmic rays, and solar cosmic rays encountered by low-altitude, polar orbiting satellites. (Author)

AD-640 326 **Field 22A, 4A, 8E, 22C K**
CFSTI Prices: HC$6.00 MF$1.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
COSMIC RESEARCH.
4 Aug 66, 283p FTD-HT-66-244
TT-66-62450
Unedited rough draft trans. of Kosmicheskie Issledovaniya (USSR) v4 n2 p179-335 1966.

Descriptors: (*Space flight, USSR), (*Space environmental conditions, USSR), (*Space biology, USSR), Orbital trajectories, Satellites (Artificial), Thrust vector control systems, Van Allen radiation belt, Radio signals, Night sky, Electron density, Cosmic rays, Meteorites, Magnetometers, Space medicine, Trajectories, Spacecraft, Guidance, Symposia.

Partial contents: Determination of a satellite orbit from data taken over long time intervals; Flywheel stabilization of satellite; Control of a space vehicle with low-thrust engines on the accelerating segment; Motion of charged particles in the field of a magnetic dipole by the Stormer method; Propagation mechanism of radio waves radiated by an artificial satellite; Intensity of the field of short radio waves emitted by an artificial satellite; Night glow in the 6300A region; Distribution of the electron concentration in the ionosphere by the method of ground reception of radio signals from a artificial satellite; Emission intensity in the radiation belts of the earth; Cosmic ray measurement aboard the 'Kosmos-17' artificial satellite; Penetration of barriers by meteorites; Penetration of a thin shield by a meteorite; Interpretation of magnetic measurements aboard the 'Pioneer-1' and its geophysical consequences; Magnetometric equipment aboard the 'Elektron-2' space station; Medical monitoring of Cosmonauts Belyayev and Leonov during training and orbital flight; Effect of space flight on wheat seeds and the plants produced from them; Motion of a rocket with a constant reaction acceleration vector; Determination of position for a space vehicle; Orientation of Interplanetary Flight by the utilization of rigidly mounted and oppositely directed telescopes; The XVIth Congress of the International Astronautical Federation; The forthcoming XVIIth Congress of the International Astronautical Federation.

AD-640 327 **Field 22A, 3A, 6C**
CFSTI Prices: HC$2.00 MF$0.50
Aerospace Technology Div., Library of Congress, Washington, D. C.
SOVIET LONG-RANGE SPACE-EXPLORATION PROGRAM: ANALYTICAL SURVEY,
by Vladimir E. Mutschall. 18 May 66, 33p ATD-66-57
TT-66-62451
See also AD-633 962.

Descriptors: (*Space flight, USSR), (*Space biology, USSR), (*Astronomy, USSR), Biology, Planetary atmospheres, Biosynthesis, Culture, Space communication systems, Lunar probes, Mars probes, Venus probes, Satellites (Artificial), Extraterrestrial radio waves, Reviews.

Identifiers: Planetary satellites, Organic evolution, Extraterrestrial life.

This is one of a series of reports containing a selection of Soviet technical papers and attempting to give the Soviet view of some space-exploration programs as they existed at the end of 1965. The problems treated here are divided into six sections as follows: (I) Life in the universe; (II) The origin of life; (III) Establishing contact with extraterrestrial civilizations; (IV) Mars' satellites; (V) Discovery of a variable radiation source; and (VI) The Soviet Space-Communications Center.

AD-640 497 **Field 22A, 20F, 20E**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Philadelphia, Pa. Missile and Space Div.

DESIGN AND ANALYSIS OF SOLID AND HOLLOW CUBE CORNER REFLECTORS AND HOLDERS.
Rept. for 15 Feb-15 Jul 66,
by William M. Meyers. 15 Jul 66, 77p Scientific-1, 66SD4431
Contract AF 19 (628)-5841
Proj. AF-7600
Task 760006
AFCRL-66-563

Descriptors: (*Astronomical geodesics, Instrumentation), (*Reflectors, Lunar environment), Lasers, Lunar satellites, Optical instruments, Design, Analysis.

The report describes the design and analysis of two types of cube corner reflectors, solid and hollow. If placed on the lunar surface with the aid of suitable soft landing spacecraft optical cube corners could be used with an earth laser system for selenodetic studies of the moon. With proper sun shielding, it should be possible to operate the cube corner reflector system during 100 percent of the lunar night and approximately 30 to 50 percent of the lunar day. Considering the displacement (due to velocity aberration) of the returned signal to colocated sending/ receiving optics to the observatory by a lunar retroreflector, a maximum return is obtained using a reflector aperture of 11 centimeters for laser radiation of 7000A. The advantages and disadvantages of the hollow and solid cube corner designs are discussed. Final decision as to the one which is most suited to this application must await the outcome of environmental testing. (Author)

N66-27039 **Field 22A**
CFSTI Prices HC$1.00 MF$0.50
International Business Machines Corp., Owego, N. Y. Space Guidance Center.
SUMMARY OF RESULTS OF ENGINEERING RESEARCH PROGRAM FOR MANNED EARTH-ORBITAL MISSIONS.
Aug 65, 25p NASA-CR-66018, IBM-65-928-63
Contract NAS1-4667

Descriptors: *Experiment design, *Manned orbital research laboratory (morl), *Nasa program, *Space program, Design, Engineering, Experiment, Laboratory, Manned, Mission, Morl, Orbital, Program, Research, Space, Technology.

For abstract, see S 04 15.

N66-27048 **Field 22A**
CFSTI Prices HC$3.00 MF$0.75
General Dynamics/convair, San Diego, Calif.
VISIBILITY IN SPACE - TARGET DESCRIPTION SUBROUTINE.
by W. T. Breckenridge Jr, R. S. Dummer, J. Geanacou, and J. T. Neu. 1966, 90p NASA-CR-65369, GD/C-DBE-66-004
Contract NAS9-4814

Descriptors: *Computer method, *Lunar excursion module (lem), *Visibility, Ascent, Command, Digital, Eclipse, Excursion, Geometry, Illuminance, Lunar, Mapping, Module, Orbit, Printout, Program, Reflectivity, Rendezvous, Service, Space, Spacecraft, Stage, Subroutine, Sunlight, Target.

For abstract, see S 04 15.

N66-27183 **Field 22A**
CFSTI Prices HC$3.00 MF$0.75
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
MARINER MARS 1964 FLIGHT DYNAMIC DATA.
by J. E. Randolph. 15 May 66, 99p NASA-CR-75339, JPL-TM-33-278
Contract NAS7-100

Descriptors: *Environmental testing, *Flight condition, *Mariner iii space probe, Bandpass, Condition, Data, Dynamic, Environment, Flight, Mariner iv space probe, Mariner spacecraft, Mars, Oscillogram, Power, Probe, Shock, Space, Spacecraft, Spectrum, Telemetry, Testing, Transducer, Vibration.

For abstract, see S 04 15.

N66-27241 **Field 22A**
CFSTI Prices HC$4.00 MF$1.00
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
ASTRONAUTICS INFORMATION ABSTRACTS. REPORTS AND OPEN LITERATURE, VOLUME VII, NO. 6.
by V. S. Anderson, N. Ives, T. P. Mac donald, B. H. Nichols, and E. C. Sidwell. Jun 63, 138p NASA-CR-75252
Contract NAS7-100

Descriptors: *Abstract, *Astronautics, *Bibliography, *Space flight, Aerospace, Compilation, Flight, Information, Literature, Space.

For abstract, see S 04 15.

N66-27531 **Field 22A**
CFSTI Prices HC$1.00 MF$0.50
Exotech, Inc., Alexandria, Va.
ANALYSIS OF PLANETARY QUARANTINE REQUIREMENTS.
by W. C. Cooley, and S. Schalkowsky. 3 Apr 66, 16p NASA-CR-75408
Contract NASW-1340

Descriptors: *Contamination, *Mathematical model, *Planet, *Sterilization, Analysis, Heat, Mathematics, Microorganism, Model, Probability, Requirement.

For abstract, see S 04 15.

N66-27535 **Field 22A**
CFSTI Prices HC$3.00 MF$0.75
Brown Engineering Co., Inc., Huntsville, Ala. Research Labs.
A MISSION FOR SURVEYING AND MAPPING THE LUNAR SURFACE.
by S. N. Heaps. Apr 66, 87p NASA-CR-75417, R-192
Contract NAS8-20166

Descriptors: *Lunar surface, *Mapping, *Mission planning, *Surveying, Apollo project, Experiment, Geodesy, Geography, Geology, Geophysics, Instrumentation, Lunar, Mission, Orbital, Planning, Remote, Sensing, Surface.

For abstract, see S 04 15.

N66-28021 **Field 22A**
CFSTI Prices HC$6.00 MF$1.25
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
EARTH ORBITAL LIFETIME PREDICTION MODEL AND PROGRAM.
by E. P. Boykin, and A. R. Mc nair. 1 Feb 66, 202p NASA-TM-X-53385

Descriptors: *Orbiting satellite, *Satellite lifetime, Atmosphere, Calculation, Density, Drag, Earth, Earth satellite, Fortran, Lifetime, Model, Orbital, Satellite.

For abstract, see S 04 15.

N66-28026 **Field 22A**
CFSTI Prices HC$6.00 MF$1.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
SPACE PROGRAMS SUMMARY NO. 37-38, VOLUME IV FOR THE PERIOD FEBRUARY 1, 1966 TO MARCH 31, 1966. SUPPORTING RESEARCH AND ADVANCED DEVELOPMENT.
30 Apr 66, 300p NASA-CR-75664, JPL-SPS-37-38, VOL. IV
Contract NAS7-100

Descriptors: *Environment simulation, *Guidance and control, *Propulsion system, *Space science, *Systems analysis, *Telecommunication, Analysis, Communication, Control, Engineering, Environment, Guidance, Mechanics, Propulsion, Radio, Science, Simulation, Space, System.

For abstract, see S 04 15.

N66-29298 **Field 22A**
CFSTI Prices HC$1.00 MF$0.50
Stanford Univ., Calif. Radioscience Lab.
THE STANFORD STUDY OF THE MARINER IV OCCULATION DATA SEMIANNUAL REPORT NO. 3, 1 OCT. 1965 - 31 MAR. 1966.
by V. R. Eshleman. Jun 66, 3p NASA-CR-75816
Contract NGR-05-020-065

Descriptors: *Atmospheric pressure, *Mars atmosphere, *Occultation, *Surface pressure, Atmospheric, Carbon dioxide, Gravitation, Haze, High pressure, Layer, Mariner program, Mars, Model, Particle, Pressure, Radius, Surface.

For abstract, see S 04 16.

N66-29339 **Field 22A**
CFSTI Prices HC$1.00 MF$0.50
Rand Corp., Santa Monica, Calif.
A SUGGESTION FOR EXTENSION OF THE NASA RANGER PROJECT IN SUPPORT OF MANNED SPACE FLIGHT.
by R. C. Moore. Dec 64, 20p NASA-CR-60466, RM-4353-NASA
Contract NASR-21/09/

Descriptors: *Apollo project, *Ranger project, *Surveyor project, Collection, Cost, Data, Effectiveness, Exploration, Impact, Lunar, Photography, Site, Surface.

For abstract, see S 04 16.

N66-29394 **Field 22A**
CFSTI Prices HC$2.00 MF$0.50
Avco Corp., Wilmington, Mass. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena. Research And Advanced Development Div.
EXPLORATION OF INTERPLANETARY SPACE BY UNMANNED VEHICLES.
by P. C. Dow Jr. 1965, 33p NASA-CR-64803
Contracts NASW-697, JPL-950896
Presented At The 5th European Space Flight Symp., Munich, 19-22 Jul. 1965 Prepared In Part For Jpl

Descriptors: *Mars (planet), *Mars probe, *Planetary-interplanetary program, *Unmanned spacecraft, Communication, Flyby, Interplanetary, Landing, Orbit, Orientation, Planetary, Probe, Program, Reliability, Site, Spacecraft, Sterilization, Trajectory, Unmanned.

For abstract, see S 04 16.

N66-29456 **Field 22A**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
NATURE OF THE SPACE ENVIRONMENT.
by J. C. Evvard. 1965, 37p NASA-TM-X-56741
Presented At 8th Ann. Missile And Space Tech. Inst., Storrs, Conn., 5 Aug. 1965

Descriptors: *Atmospheric composition, *Cosmic ray, *Magnetic storm, *Radiation dose, *Solar flare, Air, Atmospheric, Composition, Cosmic, Dose, Flare, Glow, Magnetic, Radiation, Radio, Ray, Solar, Storm, System, Transmission, Van allen belt, Wind.

For abstract, see S 04 16.

N66-29709 **Field 22A**
CFSTI Prices HC$3.00 MF$0.50
Illinois Univ., Urbana. Coordinated Science Laboratory.
AERODYNAMIC TORQUE ON A SPINNING SPHERICAL SATELLITE WITH APPLICATION TO MEASUREMENT OF ACCOMMODATION COEFFICIENTS.
by G. R. Karr. May 66, 60p NASA-CR-75983, R-295
Grant NSG-443, Contract DA-28-043-AMC-00073/E/

Descriptors: *Aerodynamic axis, *Motion equation, *Orbiting satellite, *Spin dynamics, *Torque, Aerodynamics, Axis, Dynamics, Equation, Motion, Orbit, Satellite, Sphere, Spin.

For abstract, see S 04 16.

N66-29735 **Field 22A**
CFSTI Prices HC$6.00 MF$1.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
AN APPROXIMATE SOLUTION OF THE EQUATIONS OF MOTION FOR ARBITRARY ROTATING SPACECRAFT.
by P. R. Kurzhals. May 66, 244p NASA-TM-X-57691

Descriptors: *Motion equation, *Perturbation, *Rotating body, *Satellite rotation, *Spacecraft motion, Analysis, Despinning, Distribution, Equation, Mass, Mathematics, Motion, Rotation, Satellite, Space station, Spacecraft, Spin, Torque, Variable.

For abstract, see S 04 16.

N66-35506 **Field 22A**
CFSTI Prices HC$8.50 MF$2.75
Air Force Academy, Colo.
PROCEEDINGS ON THE WORKING GROUP ON EXTRATERRESTRIAL RESOURCES - FOURTH ANNUAL MEETING.
1965, 550p NASA-CR-77328
Meeting Held 29 Nov. - 2 Dec. 1965

Descriptors: *Conference, *Extraterrestrial environment, *Interplanetary flight, *Lunar exploration, Base, Bond, Chemical, Environment, Exploration, Extraterrestrial, Flight, Interplanetary, Leakage, Life, Logistics, Lunar, Manufacture, Mineral, Ore, Propellant, Refueling, Rock, Silicate, Space, Support, System, Transportation, Water.

For abstract, see S 04 21.

N66-35546 **Field 22A**
CFSTI Prices HC$5.00 MF$1.00
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
AERO-ASTRODYNAMICS RESEARCH REVIEW NO. 2, JULY 1 - DECEMBER 30, 1964.
1 Apr 65, 153p NASA-TM-X-53295

Descriptors: *Aerodynamics, *Astrodynamics, *Automatic data processing system, *Hot-wire turbulence measuring apparatus, *Slender body, *Turbulent flow, Apparatus, Automatic, Body, Data, Filter, Flow, Flux, Hot wire, Linear, Measuring, Newton, Processing, Slender, System, Tunnel, Turbulence, Turbulent, Wind.

For abstract, see S 04 21.

N66-35596 **Field 22A**
CFSTI Prices HC$4.00 MF$1.00
Geological Survey, Washington, D. C.
ASTROGEOLOGIC STUDIES. PART D - STUDIES FOR SPACE FLIGHT PROGRAM ANNUAL PROGRESS REPORT, AUG. 25, 1962 - JUL. 1, 1963.
May 64, 141p NASA-CR-58623
NASA ORDER R-66

Descriptors: *Cratering, *Earth-moon system, *Hypervelocity impact, *Libration, *Lunar map, Crater, Earth, Emission, Flight, Geology, Hypervelocity, Impact, Infrared, Javinites, Lunar, Map, Mapping, Mare, Moon, Photogrammetry, Photometer, Projectile, Slope, Space, System, Tektite.

For abstract, see S 04 21.

N66-35745 **Field 22A**
CFSTI Prices HC$3.00 MF$0.75
Northrop Corp., Newbury Park, Calif. Ventura Div.
A STUDY ON SENSOR SYSTEMS FOR INITIATING PARACHUTE DEPLOYMENT FOR A MARS ENTRY VEHICLE FINAL REPORT.
by F. E. Mickey. Jun 66, 116p NASA-CR-76473, NVR-4062
Contracts NAS7-100, JPL-951174
Prepared For Jpl

Descriptors: *Decelerator, *Mars probe, *Parachute, *Sensor, Accelerometer, Aerodynamic, Drag, Entry, Honeycomb, Initiator, Mars, Performance, Pressure, Probe, Reliability, Retrorocket, System, Transducer, Weight.

For abstract, see S 04 21.

N66-35767 **Field 22A**
CFSTI Prices HC$3.00 MF$0.75
Alabama Univ., University. Bureau Of Engineering Research.
A STUDY OF LUNAR RESOURCES - A PRELIMINARY REPORT OF SURFACE AND SOME OTHER MINING SYSTEMS SUMMARY REPORT, 22 MAY 1965 - 1 MAY 1966.
by H. W. Ahrenholz, R. M. Cox, D. M. Grubbs, and R. Q. Shotts. 29 Apr 66, 89p NASA-CR-77720
Contract NAS8-20134

Descriptors: *Extraterrestrial environment, *Lunar geology, *Mining, *Planetary exploration, *Surface layer, Colony, Economics, Environment, Excavation, Exploration, Extraterrestrial, Geology, Layer, Life, Lunar, Mars, Planetary, Resource, Support, Surface, System, Water.

For abstract, see S 04 21.

N66-35947 **Field 22A**
CFSTI Prices HC$3.75 MF$1.25
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
MARINER MARS 1964 PROJECT REPORT - MISSION OPERATIONS.
15 Jun 66, 201p NASA-CR-77794, JPL-TR-32-881
Contract NAS7-100

Descriptors: *Mariner iv space probe, *Midcourse guidance, Flight, Guidance, Maneuver, Midcourse, Mission, Operation, Orbit, Probe, Project, Space, Spacecraft, Test, Trajectory.

For abstract, see S 04 21.

N66-35948 **Field 22A**
CFSTI Prices HC$3.25 MF$1.25
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
SURVEYOR I MISSION REPORT. PART I - MISSION DESCRIPTION AND PERFORMANCE.
by R. J. Parks. 31 Aug 66, 193p NASA-CR-77795, JPL-TR-32-1023
Contract NAS7-100

Descriptors: *Spacecraft performance, *Surveyor i spacecraft, Acquisition, Data, Engineering, Launch, Launch vehicle, Mission, Operation, Performance, Spacecraft, Surveyor, System, Tracking.

For abstract, see S 04 21.

ORO-647 **Field 22A, 20H, 18B**
CFSTI Prices: HC$3.00 MF$0.75
Franklin GNO Corp., West Palm Beach, Fla.
COMPARATIVE MERITS OF RADIOISOTOPE AND MACHINE SOURCES OF X RADIATION FOR AEROSPACE APPLICATIONS.
30 Mar 66, 87p
Contract AT (40-1)-3406

Descriptors: (*X rays, Sources).

For abstract, see N 20 19.

AD-639 781 **See Field 6C**

AD-640 256 **See Field 19D**

22B. SPACECRAFT

AD-463 207 **Field 22B, 21E**
CFSTI Price: HC$1.00
Royal Aircraft Establishment, Farnborough (England).
SOME DESIGN PARAMETERS FOR LOW THRUST GAS JET CONTROL SYSTEMS.
Technical rept.,
by B. P. Day. Feb 65, 25p TR-65014

Descriptors: (*Satellites (Artificial), Attitude control systems), (*Control jets, Satellites (Artificial)), Thrust, Hydrocarbons, Pressure, Design, Temperature, Specific heat, Gas flow, Nozzles, Great Britain, Equations, Viscosity, Boundary layer, Valves, Orifices, Air, Mathematical analysis, Theory, Performance (Engineering).

Satellite jet control valve and nozzle discharge coefficients were measured for air and propane. The pressure rise time in the valve to nozzle interspace was measured and the results correlated with theoretically predicted values. (Author)

AD-471 175 **Field 22B, 22D**
CFSTI Prices: HC$3.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
ESTABLISHMENT AND MAINTENANCE OF COMMUNICATIONS SATELLITE SYSTEMS (SINGLE LAUNCHES),
by R. N. A. Plimmer. Jul 65, 57p Technical rept. TR-65152

Descriptors: (*Communication satellites (Active), Launching), Mathematical models, Probability, Graphics, Equations, Maintenance, Statistical processes, Costs, Great Britain, Satellite networks.

A theoretical analysis is presented of the number of launches that are required to establish and maintain a satellite communication system. A simple model is used to represent the process in that launches are assumed to take place with a certain a priori probability whilst the satellites have an exponential probability distribution of lifetimes. Graphs and equations are given for the various probability distributions of the system during the establishment and maintenance phases of the system and the effect of the time interval between launches is also examined by using a Markov chain representation of the system. It is noted that many of the probability distributions are well represented by a Gaussian distribution. The results quite clearly indicate the manner in which the number of launches, and hence the cost, depend critically upon the launch success probability and the ratio of the launch interval to the satellite mean lifetime. (Author)

N66-27026 **Field 22B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.

MEASURED VELOCITIES OF INTERPLANETARY DUST PARTICLES.
by W. M. Alexander, O. E. Berg, C. W. Mc cracken, C. S. Nilsson, and L. Secretan. 1965, 6p
NASA-TM-X-56746
Submitted For Publication

Descriptors: *Impact, *Interplanetary dust, *Ogo, Array, Detector, Dust, Eccentricity, Geophysics, Inclination, Instrument, Interplanetary, Measurement, Observatory, Orbit, Orbiting geophysical observatory (ogo), Velocity, Velocity measurement.

For abstract, see S 04 15.

N66-27052 **Field 22B**
CFSTI Prices HC$3.00 MF$0.75
Airesearch Mfg. Co., Los Angeles, Calif.
DEVELOPMENT OF SUBCRITICAL NITROGEN STORAGE AND DELIVERY SYSTEM FOR ORBITAL FLIGHT TESTING FINAL REPORT.
25 Apr 66, 97p NASA-CR-65373
Contract NAS9-4242
Its Rept.-66-0357

Descriptors: *Cryogenic storage, *Flight test, *Liquid nitrogen, *Storage tank, Cryogenic, Delivery, Flight, Instrumentation, Launch vehicle, Liquid, Nitrogen, Orbital, Saturn project, Space, Storage, System, Telemetry, Testing.

For abstract, see S 04 15.

N66-27053 **Field 22B**
CFSTI Prices HC$5.00 MF$1.00
Bell Aerosystems Co., Buffalo, N. Y.
STRUCTURAL AND DYNAMIC ANALYSIS OF THE APOLLO AFT HEAT SHIELD FINAL REPORT, SEP. 12, 1964 - MAR. 1, 1966.
by J. R. Batt, R. H. Gallagher, and R. A. Gellatly.
Dec 65, 157p NASA-CR-65364, D7218-933004
Contract NAS9-3528

Descriptors: *Apollo project, *Heat shield, *Structural dynamics, Aft, Analysis, Discrete, Dynamics, Elastic, Element, Equation, Graph, Heat, Impact, Shield, Stability, Stress, Thermal, Water.

For abstract, see S 04 15.

N66-27073 **Field 22B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
THE OBJECTIVES AND DESIGN OF THE INERTIAL REFERENCE UNIT FOR THE LUNAR ORBITER.
by J. M. Simon, and R. H. Sproull. 1965, 13p
NASA-TM-X-56776
Presented At The 1965 Intern. Space Electron. Symp., Miami Beach, Fla., 2-5 Nov. 1965 Prepared Jointly With Sperry Gyroscope Co., Great Neck, N. Y.

Descriptors: *Aerial photography, *Guidance system, *Inertial reference system, *Lunar satellite, *Reconnaissance spacecraft, Aerial, Design, Equipment, Guidance, Inertial, Lunar, Orbital, Photography, Reconnaissance, Reference, Satellite, Spacecraft, System.

For abstract, see S 04 15.

N66-27217 **Field 22B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
JAPANESE ROCKET OBSERVATIONS AND EQUIPMENT.
by T. Nomura. Feb 64, 22p NASA-TT-F-8550
Transl. Into English From Soc. Instr. Control Engr. (Tokyo), V. 2, No. 6, 1963 P 395-405

Descriptors: *Celestial observation, *Radar equipment, *Solar flare, *Sounding rocket, *Telemetry, Airglow, Atmospheric, Celestial, Cosmic, Equipment, Flare, Observation, Phenomenon, Radar, Radio, Ray, Rocket, Solar, Sounding, Structure.

For abstract, see S 04 15.

N66-27240 **Field 22B**
CFSTI Prices HC$6.00 MF$1.25
State Univ. Of Iowa, Iowa City. Dept. Of Physics And Astronomy.
THE RESPONSES OF THE UNIVERSITY OF IOWA CHARGED PARTICLE DETECTORS ON EXPLORER 12 GRAPHIC SUMMARY.
by R. C. Bohlin, R. J. De coster, and L. A. Frank.
Apr 66, 227p NASA-CR-75227
Grant NSG-233-62
Its Rept.-66-15

Descriptors: *Charged particle, *Explorer xii satellite, *Graph, *Particle detector, Charge, Data, Detector, Electron, Energy, Flux, Light, Magnetic, Measurement, Monitor, Particle, Proton, Response, Satellite, Spectrometer.

For abstract, see S 04 15.

N66-27749 **Field 22B**
CFSTI Prices HC$1.00 MF$0.50
Schjeldahl (G. T.) Co., Northfield, Minn.
DEVELOPMENT OF A 425 FOOT DIAMETER PASSIVE COMMUNICATION SATELLITE WITH SELF ERECTING PROPERTIES MONTHLY PROGRESS REPORT NO. 21M, FEB. 1966.
by W. Jacobi. 1966, 19p NASA-CR-75446
Contract NAS5-3943
Its Quarterly Rept.-6

Descriptors: *Glass fiber, *Passive satellite, *Product development, Communication, Copper, Development, Equipment, Fabric, Heat, Mesh, Modification, Passive, Plating, Processing, Product, Satellite, Self-erecting, Treatment.

For abstract, see S 04 15.

N66-28036 **Field 22B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
MANUAL CONTROL OF HIGH-ALTITUDE APOLLO LAUNCH ABORT.
by N. R. Driscoll, K. R. Garren, and A. J. Meintel Jr. Jun 66, 40p NASA-TN-D-3433

Descriptors: *Abort, *Apollo spacecraft, *Attitude control, *Manual control, *Reentry, *Simulation, Attitude, Control, Failure, High altitude, Launch, Manual, Orientation, Performance, Pilot, Spacecraft, System, Visual.

For abstract, see S 04 15.

N66-29290 **Field 22B**
CFSTI Prices HC$1.00 MF$0.50
General Dynamics/convair, San Diego, Calif.
THE CENTER VENT SHAPE FOR VENTING A TANK IN A LOW GRAVITY ENVIRONMENT.
by C. K. Perkins. 25 Jul 61, 24p NASA-CR-72006, GD/C-55-D-859

Descriptors: *Centaur launch vehicle, *Liquid propellant, *Propellant tank, *Second stage, *Weightlessness, Configuration, Equilibrium, Gas, Gravity, Interface, Launch vehicle, Liquid, Propellant, Second, Stage, Tank, Ullage, Zero.

For abstract, see S 04 16.

N66-29301 **Field 22B**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
APOLLO SPACECRAFT BP-15. A CHRONOLOGY OF TECHNICAL PROGRESS AT KENNEDY SPACE CENTER.
1 Aug 65, 43p NASA-TM-X-57679, SP-207

Descriptors: *Apollo project, *Boiler plate, *Spacecraft performance, Accelerometer, Adapter, Boiler, Control, Escape, Jettisoning, Launch vehicle, Module, Motor, Performance, Pitch, Plate, Pressure, Saturn, Service, Spacecraft.

For abstract, see S 04 16.

N66-29363 **Field 22B**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
THE COSMIC SYSTEM "ELECTRON". NEW ACHIEVEMENTS OF SOVIET SCIENCE IN MASTERING THE COSMOS.
by YU. L. Logacher, G. A. Skuridin, and S. N. Vernov. 10 Apr 64, 14p NASA-TT-F-8681, ST-PR-10123
Contract NAS5-2078
Transl. Into English From Pravda (Moscow), No. 75, 15 Mar. 1964 P 3

Descriptors: *Elektron i satellite, *Elektron ii satellite, *Instrumentation, *Radiation belt, *Upper atmosphere, Atmosphere, Battery, Belt, Communication, Earth, Electron, Field, Inner, Low energy, Magnetic, Magnetometer, Measurement, Orbit, Outer, Proton, Radiation, Radio, Solar.

For abstract, see S 04 16.

N66-29438 **Field 22B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
APOLLO SPACECRAFT GASEOUS NITROGEN DELUGE SYSTEM.
by T. A. Lallas, D. T. Norton, and D. C. Smith.
10 Aug 64, 11p NASA-TM-X-56521, TR-80-2-D

Descriptors: *Apollo spacecraft, *Cost estimate, *Gas transport, *Nitrogen, *Systems analysis, Analysis, Compartment, Cost, Data, Description, Design, Displacement, Estimate, Gas, Hydrogen, Oxygen, Requirement, Supply, System, Transport.

For abstract, see S 04 16.

N66-29470 **Field 22B**
CFSTI Prices HC$4.00 MF$0.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ELECTRONIC PERFORMANCE OF THE S-52 FLIGHT 1 SPACECRAFT UNDER THERMAL-VACUUM EXPOSURE.
by H. W. Leverone, and N. Mandell. 26 Oct 64, 108p NASA-TM-X-55167, I-320-64-156

Descriptors: *Ariel ii satellite, *Electronic equipment testing, *Thermal environment, Battery, Electronic, Environment, Equipment, Exposure, Frequency, Micrometeorite, Ozone, Power, Spacecraft, Telemetry, Testing, Thermal, Transmitter, Vacuum, Voltage.

For abstract, see S 04 16.

N66-29481 **Field 22B**
CFSTI Prices HC$0.75 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
SURVEYOR I - A PRELIMINARY REPORT.
Jun 66, 50p NASA-SP-126

Descriptors: *Lunar surface, *Surface property, *Surveyor project, Electric, Geology, Lunar, Mechanical, Moon, Photography, Property, Surface, Thermal, Topography.

For abstract, see S 04 16.

N66-29512 **Field 22B**
CFSTI Prices HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
SPACE PROGRAMS SUMMARY NO. 37-39, VOLUME VI FOR THE PERIOD MARCH 1, 1966 TO APRIL 30, 1966. SPACE EXPLORATION PROGRAMS AND SPACE SCIENCES.
31 May 66, 27p NASA-CR-75931, JPL-SPS-37-39, VOL. VI
Contract NAS7-100

Descriptors: *Mariner program, *Surveyor project, *Voyager project, Deep, Exploration, Lunar, Mars, Moon, Network, Probe, Program, Space.

For abstract, see S 04 16.

N66-29740 **Field 22B**
CFSTI Prices HC$2.00 MF$0.50
Iit Research Inst., Chicago, Ill.
SPACECRAFT COST ESTIMATION.
by W. P. Finnegan, and C. A. Stone. May 66, 39p NASA-CR-76015, C-6
Contract NASR-65/06/

Descriptors: *Cost estimate, *Spacecraft, *Subsystem, Cost, Data, Estimate, Handling, Prediction, Propulsion, Structure, Television.

For abstract, see S 04 16.

N66-29756 **Field 22B**
CFSTI Prices HC$6.00 MF$1.50
Ryan Aeronautical Co., San Diego, Calif.
DEPLOYABLE LARGE AREA SOLAR ARRAY STRUCTURE FINAL DESIGN REPORT.
5 May 66, 256p NASA-CR-76048
Contracts NAS7-100, JPL-951107
Prepared For Jpl Its Rept.-20869-2

Descriptors: *Solar cell, *Structural design, Array, Cell, Characteristics, Design, Solar, Spacecraft, Structural, Structure, Thermal.

For abstract, see S 04 16.

N66-29967 **Field 22B, 9B**
CFSTI Prices HC$4.50 MF$2.25
National Aeronautics And Space Administration, Washington, D. C.
FORECASTS AND APPRAISALS FOR MANAGEMENT EVALUATION, VOLUME 2.
1966, 405p NASA-SP-6009, VOL. 2

Descriptors: *Apollo project, *Computer program, *Manual, *Mathematical model, *Performance prediction, *Weight factor, Computer, Equation, Error, Factor, Forecasting, Mathematics, Methodology, Model, Performance, Prediction, Probability, Program, Weight.

For abstract, see S 04 16.

N66-35656 **Field 22B**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
COMMUNICATIONS SATELLITES.
1966, 22p EP-40

Descriptors: *Active satellite, *Applications technology satellite (ats), *Communications satellite, *Nasa program, *Passive satellite, Activity, Application, Communications, Development, Echo i satellite, Echo ii satellite, Passive, Relay satellite, Satellite, Synchronous communications (syncom) project, Television, Telstar satellite, Transmission.

For abstract, see S 04 21.

N66-35944 **Field 22B**
CFSTI Prices HC$3.00 MF$1.00
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SYNCHRONOUS OPERATIONAL METEOROLOGICAL SATELLITE FEASIBILITY STUDY.
Jun 66, 118p NASA-TM-X-55555, X-731-66-271

Descriptors: *Applications technology satellite (ats), *Camera, *Synchronous meteorological satellite (sms), Application, Feasibility, Meteorology, Operational, Satellite, Scanning, Sms, Spin, Synchronous, Technology.

For abstract, see S 04 21.

N66-36131 **Field 22B, 6K**
CFSTI Prices HC$3.00 MF$0.75
General Dynamics Corp., Groton, Conn. Electric Boat Div.
WATER RECLAMATION SUBSYSTEMS FOR SPACE STATIONS.
by J. A. Lubitz, H. Miner, V. Speziali, J. A. Steele, and H. Wallman. 3 Jul 63, 79p NASA-CR-66168, U413-63-103
Contract NAS1-2208

Descriptors: *Potable water, *Space station, *Water recovery, Activation, Carbon, Composition, Corrosion, Dehumidify, Design, Exchange, Ion, Potability, Purification, Reclamation, Recovery, Resin, Space, Station, Subsystem, Testing, Treatment, Waste, Water.

For abstract, see S 04 21.

N66-36246 **Field 22B**
CFSTI Prices HC$1.00 MF$0.50
Smithsonian Astrophysical Observatory, Cambridge, Mass.
RE-ENTRY AND RECOVERY OF FRAGMENTS OF SATELLITE 1960 EPSILON1.
by J. De felice, E. L. Fireman, C. A. Lundquist, W. A. Munn, and D. Tilles. 21 Dec 62, 21p NASA-CR-77718, SAO SPECIAL REPT.-109
Grant NSG-87-60

Descriptors: *Fragmentation, *Reentry effect, *Spacecraft recovery, *Sputnik iv satellite, Effect, Fragment, Moonwatch program, Observation, Radioactivity, Recovery, Reentry, Satellite, Spacecraft.

For abstract, see S 04 21.

N66-36306 **Field 22B**
CFSTI Prices HC$3.00 MF$0.75
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
MARINER- MARS SCIENCE SUBSYSTEM.
by F. L. Schutz. 15 Aug 66, 105p NASA-CR-77906, JPL-TR-32-813
Contract NAS7-100

Descriptors: *Data processing, *Instrumentation, *Mariner iv space probe, Automation, Chamber, Cosmic, Data, Detector, Dust, Ionization, Magnetometer, Planetary, Plasma, Probe, Processing, Radiation, Ray, Scanning, Telescope, Television, Trap.

For abstract, see S 04 21.

N66-36344 **Field 22B**
CFSTI Prices HC$3.25 MF$1.25
Aeronutronic, Newport Beach, Calif.
RESEARCH, DEVELOPMENT, AND PRELIMINARY DESIGN FOR THE LUNAR PENETROMETER SYSTEM APPLICABLE TO THE APOLLO PROGRAM FINAL REPORT, 15 MAR. - 13 MAY 1966.
3 Jun 66, 178p NASA-CR-66179, U-3608
Contract NAS1-4923

Descriptors: *Apollo project, *Lunar probe, *Penetrometer, Concept, Design, Development, Evaluation, Excursion, Landing, Lunar, Manned, Module, Probe, Prototype, Sounding.

For abstract, see S 04 21.

N66-36345 **Field 22B**
CFSTI Prices HC$6.91 MF$4.25
Aeronutronic, Newport Beach, Calif.
RESEARCH, DEVELOPMENT, AND PRELIMINARY DESIGN FOR THE LUNAR PENETROMETER SYSTEM APPLICABLE TO THE APOLLO PROGRAM FINAL REPORT, APR. 1965 - MAR. 1966.
27 Apr 66, 642p NASA-CR-66178, U-3556
Contract NAS1-4923

Descriptors: *Apollo project, *Lunar surface, *Penetrometer, Characteristics, Communication, Impact, Landing, Link, Lunar, Measurement, Penetration, Soil, Surface, System, Telemetry, Test.

For abstract, see S 04 21.

N66-36370 **Field 22B**
CFSTI Prices HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
MARINER MARS 1964 MECHANICAL CONFIGURATION.
by R. J. Spehalski. 1 Sep 66, 28p NASA-CR-77981, JPL-TR-32-933
Contract NAS7-100

Descriptors: *Flyby mission, *Mars spacecraft, *Mechanical system, Configuration, Criterion, Design, Flyby, Gas, Ground, Mariner spacecraft, Mechanics, Mission, Operation, Pressure, Propulsion, Structure, Subsystem, System, Vane.

For abstract, see S 04 21.

AD-479 942 **See Field 22C**

AD-639 661 **See Field 20F**

AD-639 725 **See Field 17H**

AD-639 962 **See Field 14B**

N66-27943 **See Field 17B**

N66-27973 **See Field 17B**

22C. SPACECRAFT TRAJECTORIES AND REENTRY

AD-449 418 **Field 22C**
CFSTI Price: HC$23.00
Lockheed Aircraft Corp., Burbank, Calif.
ORBIT ANALYSIS OF COMMUNICATION SATELLITES.
Final rept. 15 Oct 63-1 Jun 64.
Sep 64, 234p LR-17944
Contract AF 30 (602)-3238
Proj. AF-4519
Task 451901
RADC-TDR-64-314

Descriptors: (*Communication satellites (Passive), Orbital trajectories), Solar satellites, Theory, Control systems, Reviews, Analysis, Solar radiation, Configuration, Satellites (Artificial), Magnetic fields, Real time, Astrophysics, Mechanics, Numerical analysis, Series, Programming (Computers), Partial differential equations, Matrix algebra, Corrections.

The report contains theoretical analyses on the astrodynamics of a solar sailing satellite and provides technical reviews, evaluations, and recommendations related to the astrodynamics portion of a solar sailing satellite, development of an orbit differential correction procedure, and determination of a control philosophy for orbital correction

maneuvers. The analyses are mainly qualitative in content; therefore, the course of action followed has been analytical in nature. Numerical analysis has been introduced as necessary, but has been kept to a minimum to avoid a compendium of tables, but are described so that they may be programmed on a computer with a minimum of rearrangement. (Author)

AD-468 941 **Field 22C, 3C**
CFSTI Prices: HC$2.60 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
PERTURBATIONS OF SATELLITE ORBITS BY THE GRAVITATIONAL ATTRACTION OF A THIRD BODY.
by Myrna M. Lewis. Jun 65, 20p Technical rept. TR-65118

Descriptors: (*Orbital trajectories, Gravity), (*Perturbation theory, Satellites (Artificial)), N-body problem, Elliptical orbit trajectories, Mathematical analysis, Great Britain, Equations.

Equations giving the rates of change of the six orbital elements of a close satellite due to the gravitational attraction of a third body are derived using Lagrange's planetary equations. Modified expressions are also given for evaluating the perturbations when only first order terms in the eccentricity of the disturbing body are retained. (Author)

AD-469 823 **Field 22C**
CFSTI Prices: HC$2.60 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
OPTIMUM IMPULSIVE TRANSFERS BETWEEN ELLIPTIC AND NON-COPLANAR CIRCULAR ORBITS.
Technical rept.,
by H. Hiller. Jun 65, 29p TR-65122

Descriptors: (*Circular orbit trajectories, Mathematical models), Elliptical orbit trajectories, Transfer trajectories, Velocity, Optimization, Celestial mechanics, Mathematical analysis, Great Britain.

A study has been made of optimum transfers between elliptic and noncoplanar circular orbits having a common centre of attraction and whose planes intersect along the major axis of the ellipse. Elliptic transfer paths with up to three apsidal impulses are considered with the whole plane change taking place at the (coincident) apocentres of these paths. For three-impulse transfers, the optimum mode is always to transfer from the pericentre of the elliptic orbit to the circular orbit, or vice-versa. For the two-impulse 'tilted-Hohmann' type of transfer, the optimum mode for the ellipse-in-circle arrangement of initial and final orbits is also to transfer from pericentre to circle; but the optimum mode is from apocentre to circle for both the circle-in-ellipse and overlap arrangements. (Author)

AD-471 329 **Field 22C**
CFSTI Prices: HC$3.00 MF$0.75
Royal Aircraft Establishment, Farnborough (England).
THE EFFECT OF TRANSFER INJECTION ERRORS UPON THE ACCURACY OF HIGH CIRCULAR ORBITS.
Technical rept.,
by Keith Smith. Jul 65, 67p TR-65153

Descriptors: (*Satellites (Artificial), Transfer trajectories), (*Transfer trajectories, Circular orbital trajectories), Errors, Perturbation theory, Equations, Velocity, Great Britain.

First-order relationships between the position and velocity errors at start and end of a Hohmann transfer are derived in a two-dimensional analysis. The results are then used to evaluate the effects of uncorrected first injection errors upon the mean radius and eccentricity of the final (nominally circular) orbit, assuming perfect application of the final impulsive velocity. Finally the mean radius and eccentricity errors are expressed in terms of post-orbital velocities required for nulling, such as would be required in station-keeping communication satellite systems. (Author)

AD-479 942 **Field 22C, 22B, 3C**
CFSTI Prices: HC$1.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
PERTURBATIONS OF NEAR-CIRCULAR ORBITS BY THE EARTH'S GRAVITATIONAL POTENTIAL.
Technical rept.,
by G. E. Cook. Nov 65, 20p TR-65252

Descriptors: (*Circular orbit trajectories, *Gravity), (*Satellites (Artificial), Circular orbit trajectories), Earth (Planet), Elliptical orbit trajectories, Equations of motion, Orbital trajectories, Trajectories, Perturbation theory, Rotation, Oscillation, Motion, Solar wind, Mathematical analysis.

The behaviour of near-circular orbits in the Earth's gravitational potential is discussed in detail. The major axis rotates at a non-uniform rate or oscillates about a position of equilibrium depending on the initial conditions. (Author)

AD-481 078 **Field 22C**
CFSTI Prices: HC$1.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
THE ORBITAL ELEMENTS OF COSMOS 2 FOR APRIL-JUNE, 1962.
Technical rept.,
by R. H. Merson. Dec 65, 21p TR-65284

Descriptors: (*Inclined orbit trajectories, Satellites (Artificial)), (*Satellites (Artificial), USSR), Optical tracking, Tracking cameras, Errors, Programming (Computers), Least squares method, Elliptical orbit trajectories, Data, Great Britain, Orbital trajectories, Ephemerides.

The R. A. E. Orbit Improvement Programme has been used to determine the orbital elements of the satellite COSMOS 2 (1962 iota 1) for the period April 10-Jun 9, 1962. For the first part of this period field-reduced Baker-Nunn camera observations were used and for the last part optical or visual observations. (Author)

AD-482 734 **Field 22C**
CFSTI Prices: HC$2.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
LONG-TERM EVOLUTION OF MEDIUM-DISTANCE ORBITS.
Technical rept.,
by G. E. Cook, and Diana W. Scott. Dec 65, 33p TR-65292

Descriptors: (*Orbital trajectories, Life expectancy), (*Satellites (Artificial), Orbital trajectories), Great Britain, Perturbation theory, Earth (Planet), Sun, Moon, Gravity, Programming (Computers), Lunar trajectories, Scientific satellites, Rocket trajectories, Inclined orbit trajectories, Perigee, Mathematical prediction, N-body problem.

A method is developed for predicting the long-term development of orbits having moderate to large eccentricities ($0.33 < e < 0.9$) and semi major axes up to 10 Earth radii. For many orbits of this type the lifetime depends entirely on the interaction of the luni-solar perturbations with the effects of the Earth's gravitational potential. Lifetime estimates are given for 8 satellites. (Author)

AD-482 737 **Field 22C**
CFSTI Prices: HC$1.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
REFINEMENT OF ALOUETTE 1 ORBIT, FOR THE PERIOD 27 APRIL-6 MAY 1964.
Technical rept.,
by H. Hiller. Jan 66, 19p TR-66020

Descriptors: (*Scientific satellites, *Orbital trajectories), Canada, Circular orbit trajectories, Perturbation theory, Perigee, Satellite tracking systems, Great Britain, Errors, Corrections, Satellites (Artificial), Terrestrial magnetism, Moon, Sun, N-body problem.

Identifiers: Alouette.

The orbit of Alouette 1 was computed by N.A.S.A. from observations made by Minitrack stations. For the ten-day period 27 April-6 May 1964, this orbit is refined using the same observations, by Merson's differential correction method. A comparison between the refined and N.A.S.A. orbits shows good agreement for semi major axis and right ascension of the ascending node. However, significant discrepancies occur for eccentricity and argument of perigee.

AD-639 692 **Field 22C, 9B, 17G**
CFSTI Prices: HC$2.00 MF$0.50
Naval Research Lab., Washington, D. C.
SIMPLIFIED PREDICTION EQUATIONS FOR THE NRL SATELLITE POSITION DISPLAY.
Interim rept.,
by R. J. Orsino, and T. L. Francavilla. 4 Aug 66, 33p NRL-6396
Proj. SF-019-01-03
Task 6168

Descriptors: (*Mathematical prediction, *Orbital trajectories), (*Space surveillance systems, *Display systems), (*Satellites (Artificial), Position finding).

Identifiers: SPAD.

A satellite position prediction and display equipment (SPAD) has been conceived and developed at NRL. Details regarding the operation and performance of the equipment have been described previously (AD-622 198). The present report concerns itself primarily with the equations utilized in a digital computer for performing the position prediction computations. With periodically updated orbital elements for each satellite stored in the computer memory, these equations provide position coordinates and height above the earth's surface for any satellite, at any desired time. Restricted by the limited computer speed and memory space available, the equations arrived at, in order to both satisfy the display system requirements and to meet the desired accuracy, are of a degree of complexity which places them between the basic planetary equations of celestial bodies and the much more sophisticated equations of today's space computer centers. Although modifications of the basic equations have previously been developed and reported in AD-266 596 and AD-264 949, they were successful in computing positions of only those satellites whose orbits are relatively stable. The equations of the report, which are extensions of these modified equations, are able to provide geocentric coordinate positions for those unstable satellites whose orbits are decaying rapidly. This extension is accomplished by including the time rate of change of the semimajor axis as an input orbital element and by the manner in which the period is computed.

AD-639 696 **Field 22C, 3C**
CFSTI Prices: HC$3.00 MF$0.75
Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
INVESTIGATION OF MOTION IN CISLUNAR SPACE USING THE VERY RESTRICTED FOUR-BODY MODEL.
Master's thesis,
by Roger Leon Gounaud. Jun 66, 76p GGC/EE/66-9

Descriptors: (*Equations of motion, *Satellites (Artificial)), (*Celestial mechanics, Satel-

lites (Artificial)), Numerical analysis, N-body problem.

Identifiers: Theses, Cislunar space, Restricted four body problem.

A procedure is developed for determining periodic cislunar trajectories in the very restricted four-body problem. The two initial conditions, velocity and position, are varied to satisfy the periodicity criteria. Two types of trajectories are presented, a retrograde trajectory for which a set of initial conditions was found that satisfies the requirements and a direct trajectory for which a suitable set of initial conditions could not be found that satisfied the periodicity criteria. Problems in numerical procedures near the singularities must be solved before more accurate results can be obtained. (Author)

AD-639 957 **Field 22C, 3B, 20N**
CFSTI Prices: HC$5.00 MF$1.00
Aerospace Technology Div., Library of Congress, Washington, D. C.
TRACKING OF MISSILES AND SPACE VEHICLES.
13 Jun 66, 185p ATD-66-66
TT-66-62387
Rept. on Surveys of Foreign Scientific and Technical Literature.

Descriptors: (*Guided missile tracking systems, Abstracts), (*Satellite tracking systems, Abstracts), Ionosphere, Radio astronomy, Very low frequency, Wave transmission, Ionospheric propagation, Lasers, Masers, USSR.

AD-640 220 **Field 22C, 3C**
Not available from CFSTI.
California Inst. of Tech., Pasadena.
NONPLANAR EARTH-TO-MOON TRAJECTORIES IN THE RESTRICTED THREE-BODY PROBLEM.
Revised ed.,
by P. A. Lagerstrom, and J. Kevorkian. 9 Aug 65, 6p
Grant AF-AFOSR-62-256, Contract NASw-901
Proj. AF-9749
Task 974901
AFOSR-66-1420
Revision of manuscript received 19 Apr 1965. Prepared in cooperation with Washington Univ., Seattle.
Availability: Published in AIAA Journal v4 n1 p149-52 Jan 1966.

Descriptors: (*N-body problem, *Interplanetary trajectories), Celestial mechanics, Particle trajectories, Asymptotic series, Perturbation theory.

Identifiers: Restricted three body problem.

The paper is an extension of the authors' previous work (AD-602 538) to the case of motion in three dimensions of a particle in a trajectory originating near a body of relatively large mass (the 'earth') and passing close to a body of relatively small mass (the 'moon'). As in the planar case, the motion decomposes into three parts (before, during, and after moon passage) each of which is derivable as an asymptotic expansion in the small parameter M, which is the ratio of the moon's mass to the mass of the earth-moon system. The initial conditions required at launch for the particle to pass close to the moon are now more complicated and are discussed in detail. The motion before moon passage is calculated to order M for all allowable initial conditions, then it is matched with the solution during moon passage leading to explicit formulas for the six Keplerian integrals for this phase in terms of the initial parameters. The results can also be used to write down the uniformly valid asymptotic representation to order M for the motion up to and including moon passage and for calculating the first-order orbit after moon passage. (Author)

AD-640 238 **Field 22C, 8E, 17I**
CFSTI Prices: HC$4.00 MF$0.75
Brown (D.) Associates, Inc., Eau Gallie, Fla.
ADVANCED TECHNIQUES FOR THE REDUCTION OF GEODETIC SECOR OBSERVATIONS.
Final rept.,
by Duane C. Brown. 29 Jul 66, 105p
Contract DA-44-009-AMC-937 (X)

Descriptors: (*Satellite tracking systems, Calibration), (*Orbital trajectories, Errors), (*Geodesics, Satellite tracking systems), Networks, Radar tracking, Ionosphere, Atmospheric refraction, Range finding, Mathematical models.

Identifiers: SECOR.

Techniques developed earlier (see AD-425 480) for the self-calibration of tracking systems are applied to geodetic SECOR system. An error model for Geodetic SECOR is developed, special attention being devoted to inospheric refraction. The rigorous adjustment of SECOR observations with error-model recovery is developed first on a strictly geometric basis for the isolated quad (quadrilateral). This development is extended to a special multi-quad net restricting parametric recovery to trajectory coordinates and station coordinates. It is then further extended to a general multi-quad net considering also the recovery of unstable error coefficients reinitialized for each orbital pass over each station. The adjustment is then reformulated to exercise short-arc orbital constraints, first for an unlimited number of passes over an isolated quad and subsequently for a net comprising an unlimited number of interconnected quads (each observing an unlimited number of passes). This adjustment involves the simultaneous recovery of all station coordinates in the net, together with a fresh set of orbital elements and a fresh set of error coefficient for each pass. Results obtained from the application of the theory to data gathered from two test quads establish that the reduction has an impressive potential. Because it also automatically solves the problem of unresolved, constant ranging ambiguities, the new reduction promises a much shorter data reduction cycle than the conventional reduction. (Author)

AD-640 248 **Field 22C**
CFSTI Prices: HC$1.00 MF$0.50
Foreign Technology Div., Wright-Patterson AFB, Ohio.
EPHEMERIS CALCULATION OF THE ANGULAR VELOCITY OF A SATELLITE OF THE EARTH,
by B. A. Firago. 18 Apr 66, 13p FTD-TT-65-861
TT-66-62413
Unedited rough draft trans. of Akademiya Nauk SSSR. Astronomicheskii Sovet. n32 p3-7 1963.

Descriptors: (*Satellites (Artificial), Velocity), (*Ephemerides, Satellites (Artificial)), Celestial mechanics, Optical tracking, Orbital trajectories, USSR.

Assuming the ephemeris position to be known, a method is proposed for calculating the topocentric angular velocity in accordance with the period of rotation and the geocentric radius vector of a satellite. The latter data can be found in accordance with observations at one separate station which were made on previous dates. Thus, the topocentric data of the movement of the satellite (mu, i, or 0) can be found at each station in accordance with completely accessible information. (Author)

AD-640 315 **Field 22C**
CFSTI Prices: HC$3.00 MF$0.75
Mitre Corp., Bedford, Mass.
ON THE MOTION OF AN ARTIFICIAL EARTH SATELLITE,
by J. B. Frazer. Sep 66, 58p MTR-208
Contract AF 19 (628)-5165
Proj. AF-4965
ESD-TR-66-293

Descriptors: (*Satellites (Artificial), Motion), (*Orbital trajectories, Satellites (Artificial)), Set theory, Celestial mechanics, Velocity, Drag, Circular orbit trajectories, Elliptical orbit trajectories.

The periodic position and velocity perturbations of an artificial earth satellite are developed to the first order for all Jn, based on the theory by Brouwer as extended by Giacagliz. An explicit formulation is also provided for the subset J2, J3, J4. The use of a position and velocity formulation circumvents the equatorial and circular orbit singularities found in conventional developments. The definition of the mean elements of the theory is modified to reduce the complexity of the position perturbations, as suggested by Merson's Theory, and the resulting changes to the secular terms are developed. In order to facilitate an empirical correction for drag, the observed mean motion is introduced as a mean element in place of the semi-major axis. (Author)

AD-640 466 **Field 22C**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
ON THE CHARACTERISTICS OF FAMILIES OF SATELLITES IN COPLANAR CIRCULAR ORBIT.
Memorandum rept.,
by G. M. Northrop. Sep 66, 47p RM-5155-PR
Contract AF 49 (638)-1700

Descriptors: (*Satellites (Artificial), *Circular orbit trajectories), (*Orbital trajectories, Analysis), Equations, Periodic variations, Drift, Communication satellites (Active), Meteorological satellites, Military satellites, Navigation satellites.

An analysis of the orbital characteristics of families of satellites in coplanar, circular orbit is made from a deterministic, rather than a random, point of view. The analytic results provide a basic structure that can be used in the design and planning of satellite systems for communications, weather, navigation, and warning. The basic equations describing satellite orbits are used to predict initial spreading characteristics, drift rate, potential bunching configurations, and bunching durations. Because of the complexity introduced by multiple-member families of satellites, a computer technique is used in these cases. Two spacing schemes for satellites in unperturbed, circular, coplanar orbit illustrate the analysis. (Author)

AD-640 492 **Field 22C, 20D**
CFSTI Prices: HC$3.00 MF$0.75
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
THE EFFECT OF CROSS-SECTION DISTRIBUTION ON THE STATIC STABILITY CHARACTERISTICS OF AXI-SYMMETRIC BODIES AT MACH NUMBERS OF 5.35 AND 6.71.
Technical note,
by J. F. Reilly. Jun 66, 74p TN-32
Grant AF-EOAR-96-65
Proj. AF-9750
Task 975001
AFOSR-66-2256

Descriptors: (*Reentry vehicles, Hypersonic characteristics), Stability, Bodies of revolution, Conical bodies, Flared afterbodies, Angle of attack, Belgium.

An investigation was made at hypersonic Mach numbers to determine the effects of cross-section distribution on the static stability characteristics of bodies of revolution and to obtain the aerodynamic characteristics of these bodies. All of the bodies tested had the same length and all were circular in cross-section. The bodies tested were conic, bi-conic, and tri-conic. The tests were performed at Mach numbers of 5.35 and 6.71, and at unit Reynolds numbers from 1.5 x 100,000 to 3.2 x 100,000 per centimeter. The results indicate that under certain test conditions a body with a

forecone followed by a frustum or frustum-flare combination exhibits, through the flow mechanism on the upper quarter of the body, an adverse center of pressure travel in the low angle of attack region (0 to 5 degrees). For a given moment reference point this yields both stable and unstable trim-points. (Author)

N66-27085 **Field 22C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
PERTURBATIONS IN THE MOTION OF ARTIFICAL SATELLITES DUE TO THE ELLIPTICITY OF THE EARTH.
Vozmushcheniya V Dvizhenii Iskusstvennykh Sputnikov, Vyzyvaemyye Szhatiem Zemlya
by YU. V.Batrakov, and V. F. Proskurin. Dec 63, 21p NASA-TT-F-8718
Transl. Into English From Byul. Inst. Teor. Astron. (Leningrad), V. 7, No. 7, 1960 P 537-548

Descriptors: *Earth shape, *Perturbation, *Satellite orbit, Deviation, Earth, Motion, Node, Orbit, Polynomial, Satellite, Shape, Trigonometry.

For abstract, see S 04 15.

N66-27197 **Field 22C**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SATELLITE LIBRATION ON A ELLIPTICAL ORBIT.
by H.-S. Liu. 1965, 23p NASA-TM-X-56173
Submitted For Publication

Descriptors: *Elliptical orbit, *Librational motion, *Rigid body, *Spacecraft motion, Body, Canonical, Ellipticity, Gravitation, Libration, Motion, Orbit, Oscillation, Rigid, Satellite, Spacecraft, Transformation.

For abstract, see S 04 15.

N66-27737 **Field 22C**
CFSTI Prices HC$4.00 MF$1.00
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A S-202 LAUNCH VEHICLE OPERATIONAL FLIGHT TRAJECTORY.
by P. B. Pack. 3 Jun 66, 140p NASA-TM-X-53470

Descriptors: *Flight path, *Saturn ib launch vehicle, *Trajectory analysis, Analysis, Flight, Launch vehicle, Manned, Mission, Operation, Orbit, Path, Planning, Prediction, Saturn, Spacecraft, Subsystem, Tracking, Trajectory.

For abstract, see S 04 15.

N66-28022 **Field 22C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ORBITAL CALCULATIONS AND TRAPPED RADIATION MAPPING.
by M. O. Burrell, and J. J. Wright. 8 Mar 66, 34p NASA-TM-X-53406

Descriptors: *Energy spectrum, *Orbital calculation, *Trapped radiation, Calculation, Code, Electron, Energy, Flux, Mapping, Orbital, Position, Proton, Radiation, Spectrum, Trapping.

For abstract, see S 04 15.

N66-28027 **Field 22C**
CFSTI Prices HC$3.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ANALYSIS OF AN INTERPLANETARY TRAJECTORY TARGETING TECHNIQUE WITH APPLICATION TO A 1975 VENUS FLYBY MISSION.
by B. Ellison. 12 Apr 66, 51p NASA-TM-X-53434

Descriptors: *Flyby mission, *Spacecraft trajectory, *Trajectory analysis, *Venus probe, Analysis, Flyby, Interplanetary, Method, Mission, Planet, Planning, Probe, Spacecraft, Target, Trajectory, Venus.

For abstract, see S 04 15.

N66-29405 **Field 22C**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration, Washington, D. C.
PROGRESS AND PROBLEMS IN ATMOSPHERE ENTRY.
by N. B. Cohen, and A. J. Eggers Jr. 1965, 72p NASA-TM-X-56855
Presented At The 16th Iaf Intern. Congr., Athens, 13-18 Sep. 1965

Descriptors: *Atmospheric entry, *Planetary atmosphere, *Reentry physics, Arc, Atmosphere, Atmospheric, Braking, Entry, Expansion, Field, Flow, Heat transfer, Heating, Jet, Maneuver, Mission, Motion, Physics, Planetary, Probe, Protection, Reentry, Rocket, Shock, Space, Tunnel, Turbulence.

For abstract, see S 04 16.

N66-29455 **Field 22C**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration, Washington, D. C.
QUALITATIVE ANALYSIS OF FORMS OF MOTION IN THE PROBLEM OF THE MOTION OF AN ARTIFICIAL SATELLITE IN THE NORMAL GRAVITATIONAL FIELD OF THE EARTH.
Kachestvennyy Analiz Form Dvizheniya V Zadache O Dvizhenii Iskustvennogo Sputnika V Normal'nom Pole Prityazheniya Zemli
by YE. P.Aksenov, V. G. Demin, and YE. A.Grebenikov. Oct 63, 73p NASA-TT-F-8513
Transl. Into English From Iskusstv. Sputniki Zemli (Moscow), No. 16, 1963 P 173-197

Descriptors: *Gravitational field, *Motion equation, *Orbiting satellite, *Qualitative analysis, Analysis, Artificial, Ballistics, Coordinate, Earth, Equation, Field, Form, Formula, Gravitational, Motion, Orbital, Quality, Satellite, Surface, Trajectory.

For abstract, see S 04 16.

N66-35793 **Field 22C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SATELLITE SITUATION REPORT, VOLUME 6, NO. 14.
31 Jul 66, 27p NASA-TM-X-57858, X-512-66-51

Descriptors: *Earth orbit, *Orbit decay, *Orbiting satellite, Decay, Earth, Element, Frequency, Object, Orbit, Orbital, Satellite, Table.

For abstract, see S 04 21.

N66-35794 **Field 22C**
CFSTI Prices HC$1.00 MF$0.50
Consultants And Designers, Inc., Arlington, Va.
ON THE INTERMEDIATE ORBITS OF THE EARTH'S ARTIFICIAL SATELLITES.
O Promezhutochnykh Orbitakh Iskusstvennykh Sputnikov Zemli
by E. P. Aksenov. 25 Aug 65, 17p NASA-CR-77674, ST-CM-10374
Contract NAS5-3760
Transl. Into English From Vestnik. Mosk. Univ., Ser. Iii, Fiz.- Astron. (Moscow), No. 3, 1965 P 36-44

Descriptors: *Orbit calculation, *Satellite, *Satellite orbit, Artificial, Calculation, Coordinate, Earth, Expansion, Function, Intermediate, Motion, Orbit, Perturbation, Series.

For abstract, see S 04 21.

N66-35797 **Field 22C**
CFSTI Prices HC$7.89 MF$3.25
Hughes Aircraft Co., El Segundo, Calif. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena. Space Systems Div.
SURVEYOR STATION VIEW PERIODS AND TRAJECTORY COORDINATES.
by J. N. Fisher, and R. W. Gillett. Aug 65, 590p NASA-CR-77659
Contract JPL-950056
Prepared For Jpl

Descriptors: *Spacecraft trajectory, *Surveyor project, *Tracking station, Ascent, Coordinate, Deep space instrumentation facility (dsif), Injection, Orbit, Parameter, Period, Spacecraft, Station, Tracking, Trajectory, View.

For abstract, see S 04 21.

N66-35803 **Field 22C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CALCULATION OF SMALL ROCKET TRAJECTORIES USING ONLY ROCKET-TO-LAUNCHER RADIAL VELOCITY DATA.
by J. E. Jackson, and S. M. Radicella. 15 Aug 62, 36p NASA-TM-X-55548, X-615-62-139

Descriptors: *Doppler effect, *Missile trajectory, *Radio tracking, Calculation, Data, Flight, Launcher, Method, Missile, Nike-cajun rocket, Path, Radial, Radio, Rocket, Tracking, Trajectory, Velocity.

For abstract, see S 04 21.

N66-36050 **Field 22C**
CFSTI Prices HC$4.00 MF$1.00
North American Aviation, Inc., Downey, Calif. Space And Information Systems Div.
SATELLITE ORBITAL TRANSFER STUDIES FINAL REPORT, 29 JUN. 1965 - 30 AUG. 1966.
by D. F. Bender, and G. A. Mc cue. 16 Aug 66, 115p NASA-CR-77878, SID-66-1224
Contract NAS8-20238

Descriptors: *Boundary value problem, *Orbital transfer, *Satellite orbit, Boundary, Computation, Impulse, Optimization, Orbital, Problem, Quasi-linear, Satellite, Solution, Technique, Trajectory, Transfer, Value.

For abstract, see S 04 21.

N66-36077 **Field 22C**
CFSTI Prices HC$4.00 MF$0.75
Smithsonian Astrophysical Observatory, Cambridge, Mass.
SATELLITE ORBITAL DATA.
by B. Miller. 4 Apr 66, 102p NASA-CR-77761, SAO SPECIAL REPT.-208
Grant NSG-87-60

Descriptors: *Orbital element, *Satellite orbit, Anomaly, Eccentricity, Element, Function, Inclination, Mean, Observation, Orbit, Orbital, Photograph, Satellite, Smoothness, Time.

For abstract, see S 04 21.

N66-36084 **Field 22C**
CFSTI Prices HC$4.00 MF$0.50
Smithsonian Astrophysical Observatory, Cambridge, Mass.
SATELLITE ORBITAL DATA.

by B. Miller. 5 Apr 66, 101p NASA-CR-77758, SAO SPECIAL REPT.-209
Grant NSG-87-60

Descriptors: *Orbital element, *Satellite orbit, Anomaly, Eccentricity, Element, Function, Inclination, Mean, Observation, Orbit, Orbital, Photograph, Satellite, Smoothness, Time.

For abstract, see S 04 21.

N66-36303 **Field 22C**
CFSTI Prices HC$2.00 MF$0.50
Trw Systems, Redondo Beach, Calif.
COORDINATE SYSTEMS FOR DIFFERENTIAL CORRECTION.
by E. A. Emerson, and W. W. Lemmon. Sep 66, 36p NASA-CR-604
Contract NAS1-4605-3

Descriptors: *Lunar orbiter, *Orbital calculation, *State equation, *Tracking study, Calculation, Derivative, Equation, Information, Lunar, Matrix, Normal, Orbit, Orbital, Partial, Simulation, State, Study, Tracking, Transition.

For abstract, see S 04 21.

N66-36319 **Field 22C**
CFSTI Prices HC$2.50 MF$0.75
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
FINITE-THRUST ESCAPE FROM AND CAPTURE INTO CIRCULAR AND ELLIPTIC ORBITS.
by E. A. Willis Jr. Sep 66, 65p NASA-TN-D-3606
Contract 121-30-02-01-22

Descriptors: *Escape velocity, *Hyperbolic orbit, *Trajectory analysis, Analysis, Capture, Circular, Ellipticity, Escape, Finite, Gravity, Hyperbola, Thrust, Trajectory, Vector, Velocity.

For abstract, see S 04 21.

N66-36325 **Field 22C**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
TRAJECTORY OPTIMIZATION BY EXPLICIT NUMERICAL METHODS.
by L. R. Dickey. 25 May 66, 29p NASA-TM-X-53464

Descriptors: *Numerical analysis, *Trajectory optimization, Analysis, Angle, Constraint, Equation, Linear, Motion, Numerical, Optimization, Problem, Solution, Thrust, Trajectory.

For abstract, see S 04 21.

AD-640 321 **See Field 9B**

AD-640 322 **See Field 9B**

AD-640 326 **See Field 22A**

22D. SPACECRAFT LAUNCH VEHICLES AND GROUND SUPPORT

N66-27034 **Field 22D**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
CONSTRUCTION AND LAUNCHING OF SCT-1 AND SCT-2 ROCKETS.
La Construccion Y El Lanzamiento De Los Cohetes Sct-1 Y Sct 2
by P. B. Buitron. May 63, 16p NASA-TT-F-8430
Transl. Into English From Comunicaciones Y Transportes (Mexico), V. 2, No. 9, Nov.-dec. 1960 P 38-48

Descriptors: *Ethyl alcohol, *Liquid propellant rocket engine, *Oxygen, *Sct-1 rocket, *Sct-2 rocket, Alcohol, Construction, Ethyl, Flight, Helium, Launch, Liquid, Performance, Propellant, Rocket, Rocket engine, Test.

For abstract, see S 04 15.

N66-27068 **Field 22D**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
NASA LANGLEY SMALL METEOROLOGICAL SOUNDING ROCKET DEVELOPMENT PROGRAM.
by H. B. Tolefson. 1965, 41p NASA-TM-X-56775
Presented At The Indian Natl. Comm. For Space Res. Seminar On Sounding Rocket Tech. And Expt., Thumba, India, 11 Jan. 1965

Descriptors: *Meteorological rocket, *Sounding rocket, Atmospheric, Density, Development, Engine, Measurement, Meteorology, Payload, Pressure, Rocket, Small, Sounding, Temperature, Wind.

For abstract, see S 04 15.

N66-28031 **Field 22D**
CFSTI Prices HC$3.00 MF$0.75
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ENVIRONMENTAL TEST OF NIKE APACHE ROCKET NASA 14.111 GT.
by J. A. Sterhardt. Jun 65, 95p NASA-TM-X-55494, X-671-65-236

Descriptors: *Environmental testing, *Flight test, *Instrument package, *Nike-apache rocket, *Payload, Data, Environment, Instrument, Package, Pitch, Rocket, Roll, Shock, Stress, Telemetry, Testing, Thermal, Vibration, Yaw.

For abstract, see S 04 15.

N66-28373 **Field 22D**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration, Washington, D. C.
NEW SYSTEM FOR APPROACHING THE DESIGN OF SOUNDING ROCKETS.
Su Un Nvovo Metodo Per L'impostazione Del Progetto Dei Missili Sonda
by E. Gismondi. Jun 66, 35p NASA-TT-F-10202
Transl. Into English Of A Paper Presented At The 13th Intern. Conf. On Commun., Genoa, 12-16 Oct. 1965

Descriptors: *Rocket engine design, *Single-stage rocket, *Sounding rocket, Ascent, Ballistics, Calculation, Characteristics, Configuration, Design, Missile, Performance, Rocket, Single, Sounding, Stage, Vertical.

For abstract, see S 04 15.

N66-28712 **Field 22D**
CFSTI Prices HC$7.00 MF$2.00
Mcdonnell Aircraft Corp., St. Louis, Mo.
CONTROL TECHNIQUES FOR LARGE LAUNCH VEHICLES FINAL REPORT, JUL. 1964 - SEP. 1965.
by W. J. Luedde, and J. Zaborszky. 1 Sep 65, 385p NASA-CR-75795, NASA-CR-462
Contract NAS8-11418
Summary Of This Rept. Published As Nasa-cr-462, See N66-22362 11-32

Descriptors: *Launching, *Rigid body, *Rocket booster, *Sloshing, *Space vehicle control, Body, Booster, Digital, Drift, Filter, Flexibility, Fuel, Launch vehicle, Liquid, Oscillation, Propellant, Rigid, Rocket, Space vehicle, Vibration.

For abstract, see S 04 16.

N66-29336 **Field 22D**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
S A-9/ APOLLO FIRING TEST REPORT.
by E. R. Mathews. 10 Mar 65, 40p NASA-TM-X-56408, K-PA-0002

Descriptors: *Apollo project, *Saturn i (sa-9) launch vehicle, Arm, Complex, Damage, Deflector, Flame, Launch, Launch complex, Lox, Pipe, Propellant, Takeoff, Torus, Transfer, Umbilical, Water.

For abstract, see S 04 16.

N66-29340 **Field 22D**
CFSTI Prices HC$3.00 MF$0.50
North American Aviation, Inc., Downey, Calif. Aerospace Sciences Div.
ENGINEERING METHOD TO PREDICT SATURN V VEHICLE AND LAUNCH COMPLEX ENVIRONMENTS DUE TO ROCKET JET IMPINGEMENT QUARTERLY PROGRESS REPORT NO. 2, 1 OCT. - 31 DEC. 1964.
by A. Africano. 15 Jan 65, 56p NASA-CR-57601, SID-65-44
Contract NAS8-11407

Descriptors: *Convective heat transfer, *Impact pressure, *Jet impingement, *Plume, *Saturn v launch vehicle, Convection, Environment, Force, Heat, Heat transfer, Impact, Impingement, Jet, Launch, Load, Method, Prediction, Pressure, Radiation, Rocket, Vehicle.

For abstract, see S 04 16.

N66-29351 **Field 22D**
CFSTI Prices HC$1.00 MF$0.50
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
APPROACH IN ACHIEVING HIGH RELIABILITY OF THE SATURN CLASS VEHICLES.
by E. Rees. 1965, 20p NASA-TM-X-56766
Presented At The 4th Ann. Reliability And Maintainability Conf., Los Angeles, 28-30 Jul. 1965

Descriptors: *Program management, *Reliability, *Saturn launch vehicle, Control, Engineering, Hardware, Landing, Liquid, Lunar, Management, Optimization, Oxygen, Program, Propellant, Quality, Schedule.

For abstract, see S 04 16.

N66-29368 **Field 22D**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
EXPLORATORY INVESTIGATIONS OF THE RECOVERY OF A LARGE BOOSTER BY MEANS OF AERODYNAMIC DECELERATORS AND A HOT-AIR BALLOON.
by S. H. Scher. 1965, 28p NASA-TM-X-56797
Presented At The Course In Final Phase Aerodyn. Deceleration At Minn. Univ., Minneapolis, 12 Jul. 1965

Descriptors: *Aerodynamic heating, *Balloon, *Recovery device, *Weight factor, Aerodynamic, Booster, Buoyancy, Data, Deceleration, Device, Factor, Feasibility, Heating, Hot air, Inflation, Large, Recovery, Reentry, Rocket, System, Velocity, Weight.

For abstract, see S 04 16.

N66-29480 **Field 22D**
CFSTI Prices HC$2.00 MF$0.50
National Aeronautics And Space Administration Ames Research Center, Moffett Field, Calif.

ANALYSIS OF TAILORED-INTERFACE OPERATION OF SHOCK TUBES WITH HELIUM-DRIVEN PLANETARY GASES.
by W. J. Loubsky, and J. D. Reller Jr. Jul 66, 51p NASA-TN-D-3495

Descriptors: *Computer method, *Helium, *Perfect gas, *Real gas, *Shock tunnel, Analysis, Computer, Driver, Dynamics, Flow, Gas, Interface, Method, Operation, Perfect, Real, Shock, Tailoring, Tube, Tunnel, Wave.

For abstract, see S 04 16.

N66-29516 **Field 22D**
CFSTI Prices HC$7.00 MF$1.75
General Dynamics/convair, San Diego, Calif.
OPERATIONAL CONFIGURATION DATA FOR CENTAUR GSE AND FACILITIES. VOLUME I - AIRFRAME AND MECHANICAL SYSTEMS.
by B. R. Foushee. 30 Dec 65, 315p NASA-CR-75872, GD/C-BNZ-65-034, VOL. I
Contract NAS3-3232

Descriptors: *Centaur launch vehicle, *Structural design, Airframe, Booster, Design, Equipment, Facility, Ground, Interface, Loading, Mechanical, Payload, Propellant, Structural, Support, System.

For abstract, see S 04 16.

N66-29517 **Field 22D**
CFSTI Prices HC$6.00 MF$1.25
General Dynamics/convair, San Diego, Calif.
OPERATIONAL CONFIGURATION DATA FOR CENTAUR GSE AND FACILITIES. VOLUME II - ELECTRICAL AND ELECTRONIC SYSTEMS.
by B. R. Foushee. 30 Dec 65, 239p NASA-CR-75873, GDC-BNZ-65-034, VOL. II
Contract NAS3-3232

Descriptors: *Centaur launch vehicle, *Electronic equipment, *Ground support equipment, Control, Electric, Electronic, Equipment, Flight, Ground, Guidance, Power, Support, System, Telemetry.

For abstract, see S 04 16.

N66-29518 **Field 22D**
CFSTI Prices HC$6.00 MF$1.50
General Dynamics/convair, San Diego, Calif.
OPERATIONAL CONFIGURATION DATA FOR CENTAUR GSE AND FACILITIES. VOLUME III - SERVICE AND SUPPORT SYSTEMS.
by B. R. Foushee. 30 Dec 65, 249p NASA-CR-75868, GD/C-BNZ-65-034, VOL. III
Contract NAS3-3232

Descriptors: *Centaur launch vehicle, *Ground support equipment, Electric, Equipment, Erection, Ground, Handling, Launch vehicle, Service, Support, Tower, Transport, Umbilical.

For abstract, see S 04 16.

N66-29748 **Field 22D**
CFSTI Prices HC$4.00 MF$1.00
Michigan Univ., Ann Arbor. Lab. For Fluid Flow And Heat Transport
CAVITATION DAMAGE CHARACTERISTICS IN WATER AND MERCURY FROM STUDIES IN A CAVITATING VENTURI TECHNICAL REPORT NO. 17.
by F. G. Hammitt, and M. J. Robinson. Apr 66, 126p NASA-CR-76027
Grant NSG-39-60
Its Rept.-03424-17-t

Descriptors: *Cavitation flow, *Venturi tube, *Water, Bubble, Cavitation, Collapse, Damage, Exposure, Flow, Grain, Mercury, Pit, Pressure, Size, Surface, Time, Vapor.

For abstract, see S 04 16.

N66-29909 **Field 22D**
CFSTI Prices HC$3.00 MF$0.50
Martin Co., Denver, Colo.
DESIGN HANDBOOK FOR PROTECTION OF LAUNCH COMPLEXES FROM SOLID PROPELLANT EXHAUST.
by E. Lays. Mar 66, 58p NASA-CR-76058, CR-66-11
Contract NAS10-2300

Descriptors: *Exhaust, *Handbook, *Launch complex, *Protection, *Solid propellant rocket engine, Acceleration, Acoustic, Deflector, Design, Duct, Engine, Erosion, Launch, Pressure, Propellant, Rocket, Solid, Thermal.

For abstract, see S 04 16.

N66-29911 **Field 22D**
CFSTI Prices HC$3.00 MF$0.50
Autonetics, Anaheim, Calif. Data Systems Div.
STUDY OF STRUCTURAL BENDING ADAPTIVE CONTROL TECHNIQUES FOR LARGE LAUNCH VEHICLES TECHNICAL SUMMARY REPORT, VOLUME I.
16 Mar 66, 59p NASA-CR-76056, C6-673/33, VOL. I
Contract NAS8-20056

Descriptors: *Adaptive control system, *Closed loop system, *Launch vehicle, *Trajectory analysis, Adaptive, Analysis, Bending, Close, Control, Frequency, Identification, Launch, Loop, Simulation, Spectrum, System, Trajectory, Vehicle.

For abstract, see S 04 16.

N66-29912 **Field 22D**
CFSTI Prices HC$7.00 MF$1.75
Autonetics, Anaheim, Calif. Data Systems Div.
STUDY OF STRUCTURAL BENDING ADAPTIVE CONTROL TECHNIQUES FOR LARGE LAUNCH VEHICLES TECHNICAL SUMMARY REPORT, VOLUME II.
16 Mar 66, 330p NASA-CR-76055, C6-673/33, VOL. II
Contract NAS8-20056

Descriptors: *Adaptive control system, *Closed loop system, *Launch vehicle, *Trajectory analysis, Adaptive, Analysis, Bending, Close, Control, Frequency, Identification, Launch, Loop, Simulation, Spectrum, System, Trajectory, Vehicle.

For abstract, see S 04 16.

N66-35766 **Field 22D**
CFSTI Prices HC$1.00 MF$0.50
Boeing Co., Huntsville, Ala.
ADVANCED SYSTEMS CHECKOUT DESIGN FOURTH QUARTERLY PROGRESS REPORT, MAR. 30 - JUN. 29, 1966.
29 Jun 66, 12p NASA-CR-77522
Contract NAS8-20240

Descriptors: *Checkout equipment, *Saturn launch vehicle, *Spacecraft instrumentation, Checkout, Equipment, Guide, Implementation, Instrumentation, Launch, Line, Onboard, Saturn, Spacecraft, System, Test, Unit, Vehicle.

For abstract, see S 04 21.

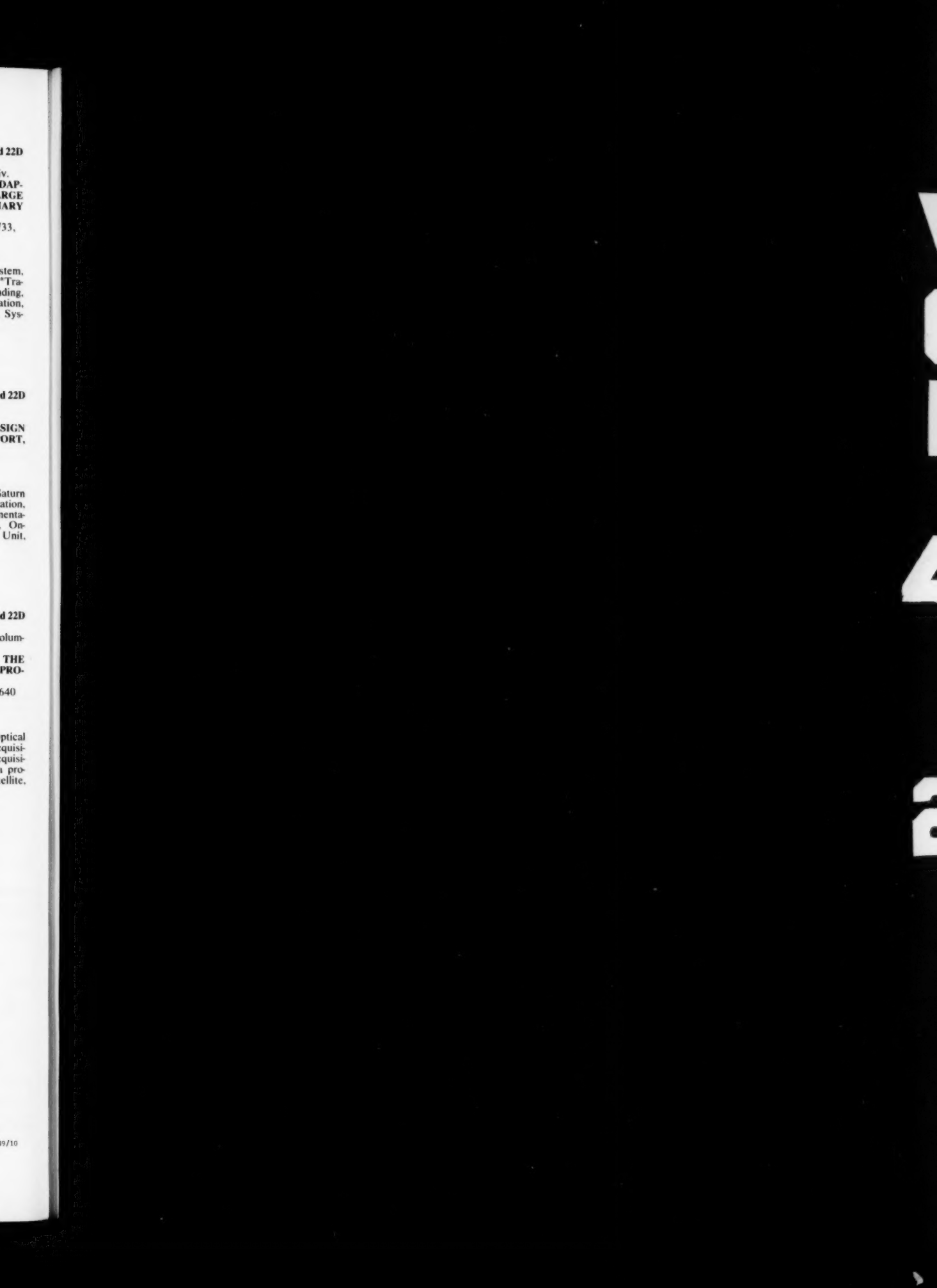
N66-35799 **Field 22D**
CFSTI Prices HC$2.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus.
PROPOSED OPTICAL NETWORK FOR THE NATIONAL GEODETIC SATELLITE PROGRAM.
by I. I. Mueller. May 66, 48p NASA-CR-77640
Contract NSR-36-008-003
Its Rept.-71

Descriptors: *Geodetic satellite, *Optical tracking, *Satellite tracking and data acquisition network p, *Tracking station, Acquisition, Data, Geodesy, List, Map, Nasa program, Network, Optical, Program, Satellite, Station, Tracking.

For abstract, see S 04 21.

AD-471 175 **See Field 22B**

☆U. S. GOVERNMENT PRINTING OFFICE : 1966 252-089/10



ZKD 49

US, FE
DIST O

AIRPOR

L. C. V

FAA-430
/66-

FAA-SYS

ZKD 502

US, FED
DIST OF

DRAWING

J. E. C

FAA-440
/66-

FAA-SYS

ZKD 503

US, FED
DIST OF

CRITERIA
FACILITY

J. E. CL

FAA-440-
/66-

FAA-SYST

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DIST OF C

RUNWAY SL

J. B. HEN

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US, FED A
DIST OF C

AIRPORT LA

T. O. ARNT

FAA-430-01
/66-

FAA-SYSTEM

ZKD 521

US, FED AV
DIST OF CO

DEVELOPMEN
AIRPORT SY

CURRENT r & d PROJECTS

01 AERONAUTICS

••••••••••

ZKD 498 FIELD 17G, 1E

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

AIRPORT GUIDANCE SIGNS

L. C. VIPOND

FAA-430-007
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

••••••••••

ZKD 502 FIELD 1E,17B,17G

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DRAWINGS AND SPECIFICATIONS FOR NAS

J. E. CLARK

FAA-440-605
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

••••••••••

ZKD 503 FIELD 1E, 1C

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

CRITERIA FOR THE ESTABLISHMENT OF FACILITY SYSTEMS

J. E. CLARK

FAA-440-606
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

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ZKD 514 FIELD 1E, 1B

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

RUNWAY SLUSH MEASURING SYSTEM

J. B. HENDON

FAA-450-403
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FAA-SYSTEMS RES + DEVEL SERVICE

••••••••••

ZKD 520 FIELD 1E

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

AIRPORT LAND USES

T. O. ARNTSEN

FAA-430-016
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

••••••••••

ZKD 521 FIELD 1C

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DEVELOPMENT OF TECHNIQUES FOR NATIONAL AIRPORT SYSTEM PLANNING

T. O. ARNTSEN

FAA-430-012
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

••••••••••

ZKD 585 FIELD 1C, 1B

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DEVELOPMENT OF ENVIRONMENT

G. J. MARKS

FAA-420-203
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

••••••••••

ZKD 591 FIELD 1E

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DEVELOPMENT OF RELIABILITY SPECIFICATIONS

K. T. OSTRAND

FAA-420-210
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

••••••••••

ZKD 599 FIELD 1C, 1E

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DEVELOPMENT OF DESIGNS FOR ENVIRONMENTAL DESIGNS FOR FACILITY SYSTEMS

J. E. CLARK

FAA-440-604
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

••••••••••

ZQF 260097 FIELD 1C,22B,22A, 7C

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

PAYLOAD ENGINEERING RESEARCH

W. K. VICKERY

/65- /

DOD-AIR FORCE

03 ASTRONOMY AND ASTROPHYSICS

••••••••••

GQF 4537 FIELD 3A, 3B, 5A,18A

CASE INST OF TECHNOL, GRADUATE SCHOOL, PHYSICS, OHIO

AN EXPERIMENT TO DETECT SOLAR NEUTRINOS

F. REINES

AF-AFOSR-0908-65
/65- /

DOD-AIR FORCE

••••••••••

GQF 207561 FIELD 3A, 3B, 9+, 9A

NEW YORK UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

QUANTITATIVE SPECTROSCOPY BY USE OF PHOTOELECTRIC IMAGING SYSTEMS

K. KISSEL

/65- /

DOD-AIR FORCE

••••••••••

GQF 258317 3 FIELD 3A, 3B, 4A, 9+

DEVELOPMENT OF INTERFEROMETRIC SPECTROSCOPIC TECHNIQUES AND STUDY OF IR STELLAR INTENSITIES

L. MERTZ

AF-19-628-00484
/65- /

DOD-AIR FORCE

••••••••••

GQF 258323 2 FIELD 3A, 3B, 4A

SOUTHWESTERN MEMPHIS, UNDERGRADUATE SCHOOL, TENNESSEE

OBSERVE SPECTRAL + TEMPORAL CHANGES IN IR SPECTRA OF SFERICS + OBSERVE SPECTRAL CHANGES IN IR SPECTRA OF LATE STARS

J. TAYLOR

AF-19-628-02371
/65- /

DOD-AIR FORCE

••••••••••

GQF 258763 1 FIELD 3A,20M,20I, 7B

RESEARCH INTO THE DYNAMICS OF SOLAR + STELLAR ATMOSPHERES

C. A. WHITNEY

AF-19-628-03877
/65- /

DOD-AIR FORCE

••••••••••

UT 553 FIELD 3A

PROGRAM FOR RESEARCH IN GALACTIC STRUCTURE

A. G. PHILIP

9/65- 8/66

RESEARCH CORP-WILLIAMS-WATERMAN FUND

04 ATMOSPHERIC SCIENCES

••••••••••

GQF 103858 2 FIELD 4A, 9C, 9+,19+

TEX. INSTR., INC., D, TEXAS

AERIAL SPECTRAL OBSERVATION OF SURFACE GAMMA RADIATION

• NONE

AF-49-638-01417

/65- /

DOD-AIR FORCE

****

GQF 258057 1 FIELD 4A,22C, 8E,12A

AMER SC + ENGR CO, MASSACHUSETTS

DEVELOPMENT OF OPERATIONAL ATMOSPHERIC DENSITY SENSOR FOR MEASUREMENTS TO 200 KM ALTITUDE

• NONE

AF-19-628-04202
/65- /

DOD-AIR FORCE

****

GQF 258180 3 FIELD 13A, 4A,12A, 8E

GUTENBERG UNIVERSITY, GERMANY

STUDY OF TRANSMISSION OF OPTICAL RADIATION THROUGH THE ATMOSPHERE

K. BULLRICH

AF-61-052-00595
/65- /

DOD-AIR FORCE

****

GQF 258332 2 FIELD 4A,12A, 8E

ATMOSPHERIC R + D CORP, KANSAS CITY, MISSOURI

COMPILATION OF WORLD-WIDE CLIMATOLOGY OF THUNDERSTORM CLOUD PENETRATIONS ABOVE THE TROPOPAUSE

R. G. BEEBE

AF-19-628-05189
/65- /

DOD-AIR FORCE

****

GQF 258980 FIELD 22A, 4A

UNIVERSITY OF OKLAHOMA, SCHOOL OF ENGINEERING, ENGINEERING, OKLAHOMA

STUDY OF THE DISTRIBUTION OF ATMOSPHERIC DENSITY BELOW 200 KM AND ASSOCIATED VERTICAL MOTIONS

W. J. SAUCIER

AF-19-628-04767
/65- /

DOD-AIR FORCE

****

GQF 259321 FIELD 7C, 7A, 7B

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, ILLINOIS

STUDY OF CLOUD PHYSICS AND PRECIPITATION PROCESSES

• NONE

AF-19-628-05031
/65- /

DOD-AIR FORCE

****

GQQ 8200 FIELD 22A,20M, 4A,20C

NATL ENGR SCIENCE CO, PASADENA, CALIFORNIA

HIGH ALTITUDE AIR SAMPLER DEVELOPMENT

F. LEE, R. HASKELL

/65- /

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GQQ 8201 FIELD 22A,22C, 7A, 7C

VARIAN ASSOCIATES, PALO ALTO, CALIFORNIA

HIGH ALTITUDE AIR SAMPLER DEVELOPMENT

W. LLOYD, F. TURNER

AF-33-657-13013
/65- /

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GSE 816 FIELD 4A

UNIVERSITY OF KANSAS, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, KANSAS

IONOSPHERIC AND GYROTROPIC MEDIA PROPAGATION

H. UNZ

NSF-GK-465
8/65- 8/66

NSF-ENGINEERING SCIENCES DIVISION

****

GSP 2562 FIELD 4A

IQSY EQUATORIAL BALLOON EXPEDITION

B. STILLER, W. O. ROBERTS, B. •. STILLER

GP-C160
9/64- 9/65

NSF-PHYSICAL SCIENCES DIVISION

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ZQF 260121 FIELD 22C, 8D, 4A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

METEOR PHYSICS

R. K. SOBERMAN

/65- /

DOD-AIR FORCE

05 BEHAVIORAL AND SOCIAL SCIENCES

****

GQP 70081 1 FIELD 5A,12A,15C,20F

GENERAL ELECTRIC CO, SANTA BARBARA, CALIFORNIA

DASA DATA CENTER

W. CHAN, E. MARTIN

DA-49-146-XZ-282
/65- /

DEFENSE-ATOMIC SUPPORT AGENCY

****

GR 68

STUDY OF CHICAGO UNIVERSITY ON RELOCATION AIDS FOR SMALL BUSINESS DISPLACED BY URBAN RENEWAL

J. MELTZER, B. J. BERRY

/66- /

HOUSING AND HOME FINANCE AGENCY

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GR 71

ROLE OF STATE GOVERNMENT IN LOCAL URBAN RENEWAL PROCESS (DEVELOP GUIDELINES)

L. JONES, G. KIEFER

/66- /

HOUSING AND HOME FINANCE AGENCY

****

GR 72

UPDATING + REPUBLISHING PROVIDENCE COLLEGE HILL REPORT-RENEWAL AND PRESERVATION OF HISTORIC AREA

F. H. MALLEY

/66- /

HOUSING AND HOME FINANCE AGENCY

****

GSS 826

THE LOGIC OF THE MICROCOSM

W. C. SALMON

NSF-GS-829
6/65- 6/66

NSF-SOCIAL SCIENCES DIVISION

****

ZBA 274 1 FIELD 12A

USDC, NATL BUR STAN, DIST OF COLUMBIA

INFORMATION SELECTION AND RETRIEVAL

M. E. STEVENS

NBS-1200-12-12101
/64- /

COMMERCE-NATIONAL BUREAU OF STANDARDS

06 BIOLOGICAL AND MEDICAL SCIENCES

****

1A1 5632 3 FIELD 7C, 7D

EMORY UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, GEORGIA

APPROACHES TO THE SYNTHESES OF THE MITOMYCINS

L. MANDELL

12/65-11/66

PHS-NIH-NATL INST ALLERGY + INFECT DIS

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PUH 106 FIELD 7C, 7D

STATE UNIV N Y BUFFALO, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

SYNTHESIS AND SPECTRAL PROPERTIES OF UROBILIN MODELS

K. M. WELLMAN, R. A. SMITH

7/65- 6/66

UNITED HEALTH FOUNDATIONS

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QH 225 FIELD 7C, 7D, 7A

MASS INST OF TECHNOL, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

ELECTRON SPIN RESONANCE SPECTROSCOPY OF PARAMAGNETIC SPECIES DERIVABLE FROM TOBACCO AND RELATED SYSTEMS

J. S. WAUGH

448R1
12/65-11/66

COUNCIL FOR TOBACCO RES

07 CHEMISTRY

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1AM 4257 6 FIELD 7C, 7D,20J, 7

STANFORD UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

MASS SPECTROMETRY IN ORGANIC AND BIOCHEMISTRY

C. DJERASSI

10/65- 9/66

PHS-NIH-NATL INST ARTHRITIS + METAB DIS

•••••••••

7GX 758 3 FIELD 7C, 7D, 7B

UNIV OF WASHINGTON, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, WASHINGTON

UNIQUE DETERMINATION OF LIGNIN SULFONATES IN WATER

J. L. MCCARTHY, B. F. HRUTFIORD

7-WP-00627-03
1/66-12/66

PHS-BSS

•••••••••

7GX 872 2 FIELD 7C, 7D,20M,20J

VANDERBILT UNIVERSITY, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, TENNESSEE

ACID HALIDE + AMMONIA SORPTION BY INNER COMPLEX SALTS

G. T. FISHER, M. M. JONES, M. J. MORRIS

7-AP-00325-02
9/65- 8/66

PHS-BSS

•••••••••

7GX 1313 2 1 FIELD 7C, 7A, 7D,20M

STANFORD RESEARCH INST, MENLO PARK, CALIFORNIA

STRUCTURE AND REACTIVITY OF RADICALS AND MOLECULES

S. W. BENSON, D. M. GOLDEN, A. RODGERS R. SHAW, R. WALSH

7-AP-00353-02
4/66-10/66

PHS-BSS

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7GX 1863 1 1 FIELD 7C, 7D, 7B

UNIV OF CAL-BERKELEY, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, CALIFORNIA

CATALYTIC REDUCTION OF OXIDES OF NITROGEN

R. J. AYEN

7-AP-00387-01
7/65-11/65

PHS-BSS

•••••••••

7GX 1864 1 FIELD 7A, 7D, 7B

UNIVERSITY OF COLORADO, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, COLORADO

CATALYTIC MECHANISMS FOR NITROGEN OXIDES REDUCTION

M. S. PETERS, E. STERRIS

7-AP-00386-01
1/65-12/65

PHS-BSS

•••••••••

7GX 3565 1 FIELD 13A,13B, 7C, 7A

CAL ST COLL, L. A., GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

PHOTOLYTIC OXIDATION IN THE PRESENCE OF NO2

S. JAFFE

7-AP-00462-01
1/66-12/66

PHS-BSS

•••••••••

7GX 3582 1 FIELD 7C,21B, 7A, 7E

BATTELLE MEMORIAL IN, OHIO

KINETICS OF SULFUR-OXIDE FORMATION IN FLAMES

A. LEVY, E. L. MERRYMAN

7-AP-00464-01
2/66- 1/67

PHS-BSS

•••••••••

7GX 3814 1 FIELD 7C, 7D, 7B

PENNSYLVANIA ST UNIV, GRADUATE SCHOOL, CHEMISTRY, PENNSYLVANIA

RADIATION STUDIES IN IONIC MATRICES

I. C. HISATSUNE, W. W. MILLER

7-RH-00433-01
3/66- 2/67

PHS-BSS

•••••••••

GQF 4351 FIELD 5A

UNIV OF CONNECTICUT, GRADUATE SCHOOL, PHYSICS, CONNECTICUT

COINCIDENCE STUDIES IN VIOLENT ATOMIC COLLISIONS

E. EVERHART

AF-AFOSR-0805-65
/65- /

DOD-AIR FORCE

•••••••••

GQF 4398 FIELD 7A, 7D, 5A,20M

IOWA ST UNIV SCI TECH, GRADUATE SCHOOL, PHYSICS, IOWA

FIFTH RARE EARTH RESEARCH CONFERENCE

S. LEGVOLD

AF-AFOSR-0812-65
/65- /

DOD-AIR FORCE

•••••••••

GQF 4431 FIELD 7A, 7D,20J,20L

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, ILLINOIS

DEVELOPMENT OF A MOLECULAR BEAM ACCELERATOR

L. WHARTON

AF-AFOSR-0866-65
/65- /

DOD-AIR FORCE

•••••••••

GQF 4542 FIELD 7C,20J

BATTELLE MEMORIAL IN, OHIO

FAR INFRARED STUDIES OF THE HYDROGEN BOND

R. J. JAKOBSEN

AF-AFOSR-0911-65
/65- /

DOD-AIR FORCE

•••••••••

GQF 19815 FIELD 7C, 7A, 7D,20J

MELLON INST OF INDUS, PENNSYLVANIA

KINETIC SPECTROSCOPY IN THE INFARED

R. M. HEXTER

AF-AFOSR-0976-66
/65- /

DOD-AIR FORCE

•••••••••

GQF 207203 6 FIELD 7A, 7D,20M,20J

UNIV OF COPENHAGEN, DENMARK

APPLICATION OF THEORY OF IRREVERSIBLE PROCESSES TO PROBLEMS OF DIFFUSION AND CHEMICAL REACTIONS

T. A. BAK

AF-61-052-00697
/65- /

DOD-AIR FORCE

•••••••••

GQF 258307 1 FIELD 20D, 5A,20I, 7B

CATHOLIC UNIV OF AMER, GRADUATE SCHOOL, PHYSICS, DIST OF COLUMBIA

STUDY OF RELAXATION RATES OF IR TRANSITIONS IN NEUTRAL AND IONIZED GASES

J. W. QUINN

AF-19-628-03870
/65- /

DOD-AIR FORCE

•••••••••

GQF 258629 3 FIELD 5A,20F, 7B

STUDIES OF ABSORPTION LINE SHAPES AND CALCULATION OF SPECTRAL CONTOURS OF MOLECULAR ABSORPTION BAND

E. K. GORA

AF-19-628-00282
/65- /

DOD-AIR FORCE

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GQF 258635 1 FIELD 12A,20H, 5A

MICHIGAN STATE UNIV, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, MICHIGAN

STUDY ABSORPTION SPECTRA OF POLYATOMIC MOLECULES IN THE INFRARED + ANALYZE STATISTICALLY

T. H. EDWARDS

AF-19-628-04009
/65- /

DOD-AIR FORCE

•••••••••

GQF 259143 FIELD 7C,10B, 7B

ENGELHARD IND., INC., NEW JERSEY

MODIFY STANDARD HYDROGEN GENERATOR ML-539 TO PRODUCE 100 PERCENT HYDROGEN

J. MOONEY

AF-19-628-04969
/65- /

DOD-AIR FORCE

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GQF 259564 FIELD 20J, 5A,18A, 7B

UNIVERSITY OF OKLAHOMA, GRADUATE SCHOOL, PHYSICS, OKLAHOMA

THEORETICAL EFFORT ON INELASTIC COLLISIONS OF ELECTRONS WITH ATOMS AND DIATOMIC MOLECULES

C. C. LIN

AF-19-628-04973
/65- /

DOD-AIR FORCE

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GQF 259645 FIELD 5A, 7B

UNIV OF TENNESSEE, GRADUATE SCHOOL, PHYSICS, TENNESSEE

EXPERIMENTAL STUDIES OF INFRARED ABSORPTION LINES OF SIMPLE MOLECULES

A. H. NIELSEN

AF-19-628-04323
/65- /

DOD-AIR FORCE

****

GQF 259872 FIELD 20L, 7B

HEBREW UNIVERSITY, ISRAEL

MEAS + ANALY OF EMISSION + ABSORPTION SPECTRA OF SELECT MATS DUE TO ELEC TRANSITIONS

W. LOW

AF-EOAR-0039-65
/65- /

DOD-AIR FORCE

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GQF 284741 2 FIELD 7D, 7A,20M,11F

UNIVERSITY OF ROME, ITALY

HIGH TEMPERATURE MASS SPECTROMETRIC STUDIES

G. DEMARIA

AF-61-052-00707
/65- /

DOD-AIR FORCE

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GQQ 595146 2 FIELD 7C, 7D, 7A, 7B

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, CHEMISTRY, NORTH CAROLINA

ADSORPTION OF METAL COMPLEXES AT ELECTRODE SURFACES

R. W. MURRAY

SD-100
/65- /

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GQQ 595151 1 FIELD 7C, 7D,20M,20J

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, CHEMISTRY, NORTH CAROLINA

SPIN-SPIN COUPLING IN BINUCLEAR COMPLEXES

W. E. HATFIELD

SD-100
/65- /

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GQQ 595191 2 FIELD 7C, 7D,20J, 7B

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, CHEMISTRY, NORTH CAROLINA

THE SYNTHESIS AND CHARACTERIZATION OF NEW INORGANIC SOLID SUBSTANCES

S. Y. TYREE, S. M. HORNER

SD-100
/65- /

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GSB 4202 4 FIELD 7C, 7B

YALE UNIVERSITY, SCHOOL OF MEDICINE, PHARMACOLOGY, CONNECTICUT

ANALOGOUS OXYGEN, SULFUR, AND SELENIUM COMPOUNDS

H. G. MAUTNER

NSF-GB-4114
9/65- 8/66

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

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GSB 4245 2 FIELD 7C, 7D,20J

NEW YORK UNIVERSITY, SCHOOL OF DENTISTRY, BIOCHEMISTRY, NEW YORK

GEOMETRICALLY DETERMINED CHEMICAL REACTIONS

M. LEVY

NSF-GB-4134
9/65- 9/66

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

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GSB 5108 FIELD 5A,20L

UNIV OF NEW HAMPSHIRE, GRADUATE SCHOOL, PHYSICS, NEW HAMPSHIRE

AN ELECTRON SPIN RESONANCE STUDY OF FREE RADICAL-MOLECULE REACTIONS

R. B. SIMPSON

GB-4755
2/66- 2/67

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

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GSE 111 3 FIELD 7C, 7D,20M,11G

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, MASSACHUSETTS

GAS AND VAPOR TRANSMISSION THROUGH POLYMER FILMS

A. S. MICHAELS, H. J. BIXLER

NSF-GP-1838
7/64- 7/65

NSF-ENGINEERING SCIENCES DIVISION

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GSE 375 2 FIELD 7C, 7D,20M,20C

CAL INST OF TECHNOLOGY, SCHOOL OF ENGINEERING, CHEMISTRY + CHEM ENGIN, CALIFORNIA

VISCOSITY AND THERMAL CONDUCTIVITY OF HYDROCARBONS AND THEIR MIXTURES

B. H. SAGE

NSF-GK-715
12/65-12/66

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GSE 889 FIELD 7C,11G,20J

CASE INST OF TECHNOL, SCHOOL OF ENGINEERING, ENGINEERING, OHIO

LASER-SOURCE RAMAN SPECTROPHOTOMETER

R. E. BOLZ

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12/65-12/66

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GSE 914 FIELD 7C, 7D,20M,20L

FLOW INSTABILITY THRESHOLD OF DIFFERENT FLUIDS IN A NATURAL-CIRCULATION LOOP

D. G. HARDEN

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GSE 935 FIELD 7C, 7D, 7A,12

UNIV OF WISCONSIN, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, WISCONSIN

DIFFUSION AND THE PRINCIPLE OF CORRESPONDING STATES

W. E. STEWART

GK-678
11/65-10/66

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GSE 938 FIELD 7D, 7A,20I

CATAPHORESIS EFFECT IN GAS DISCHARGES

L. M. CHANIN

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1/66-12/66

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GSE 962 FIELD 7A, 7D, 9+, 7B

TULANE UNIV OF LA, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, LOUISIANA

NEW TOOLS IN THE DYNAMIC ANALYSIS OF C TALYTIC REACTIONS

R. P. CHAMBERS

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NSF-ENGINEERING SCIENCES DIVISION

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GSE 1056 FIELD 7A, 7D,20M, 7B

RICE UNIVERSITY, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, TEXAS

NUCLEATION OF PHASE TRANSITION FOR LIQUID SOLUTIONS OF DISSOLVED GASES

G. D. FISHER

GK-862
2/66- 1/67

NSF-ENGINEERING SCIENCES DIVISION

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GSP 2447 FIELD 20J, 5A

QUANTAL THEORY OF CHEMICAL BONDING

G. H. DUFFY

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GYE 120344 FIELD 7C, 7D, 7A, 7B

USDA, PEORIA, ILLINOIS

CEREAL STARCH REACTIONS IN A DIELECTRIC FIELD

J. E. HODGE

AF-AFOSR-01-67B
5/65- 4/66

AGRICULTURE-DEPT OF AGRICULTURE

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NG 91 FIELD 7C, 7D, 7A, 9+

PURDUE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, INDIANA

KINETIC STUDIES OF RAPID CHEMICAL REACTIONS WITH DERIVATIVE VOLTAMMETRY

S. P. PERONE, H. STAPELFELDT

6/65- 5/66

PURDUE UNIVERSITY

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NG 98 FIELD 7C, 7A, 7D,20J

PURDUE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, INDIANA

OLEFIN ALDEHYDE CONDENSATIONS

J. WOLINSKY, R. HUTCHINS

6/65- 6/66

PURDUE UNIVERSITY

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PCS 435 FIELD 7D,20J,20L, 7B

THE INTERACTION OF HYDROGEN AND DEUTERIUM MOLECULAR BEAMS WITH ATOMICALLY CLEAN METAL SURFACES

R. P. MERRILL

600-G2
9/65- 8/66

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PCS 465 FIELD 7C, 7D

THE SYNTHESIS AND REACTIVITY OF SOME BICYCLONENES

R. E. WINTER

605-G1
9/65- 8/66

PETROLEUM RESEARCH FUND-AMER CHEM SOC

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PCS 490 FIELD 7C, 7A, 7D,20J

GEORGIA INST OF TECH, GRADUATE SCHOOL, CHEMISTRY, GEORGIA

ENOLATES OF UNSYMMETRICAL KETONES

D. S. CAINE

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PCS 491 FIELD 20J, 7B

GEORGIA INST OF TECH, GRADUATE SCHOOL, CHEMISTRY, GEORGIA

ATOMIC AND MOLECULAR WAVEFUNCTIONS CONSTRUCTED FROM POLYNOMIAL-TYPE ORBITALS

B. M. GIMARC

1/66-12/66

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PCS 497 FIELD 7C, 7D,20J, 7B

UNIV OF PENNSYLVANIA, GRADUATE SCHOOL, CHEMISTRY, PENNSYLVANIA

GROUP IV ANALOGS OF ANALOGS OF ETHYL COMPOUNDS

A. G. MACDIARMID

2/66- 8/67

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PCS 498 FIELD 7C, 7A, 7D,20M

WESLEYAN UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, CONNECTICUT

THERMODYNAMICS OF NON-POLAR MIXTURES

J. D. GONEZ-IBANEZ

2/66- 8/67

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PCS 501 FIELD 7C, 7D,20J, 7B

UNIV OF LEICESTER, UNITED KINGDOM

ARYNES, CARBENES AND NITRENES

C. W. REES

3/66- 8/67

ETROLEUM RESEARCH FUND-AMER CHEM SOC

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PCS 505 FIELD 7C, 7A, 7D

UNIV OF HOUSTON, GRADUATE SCHOOL, CHEMISTRY, TEXAS

THE VINYLCYCLOPROPANE REARRANGEMENT

M. R. WILLCOTT

2/66- 8/67

PETROLEUM RESEARCH FUND-AMER CHEM SOC

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TES 912 FIELD 7C, 7D

FURTHER RESEARCHES IN CHEMISTRY AND RELATED SCIENCES

L. PAULING, L. O. PAULING

4/65- 3/66

GUGGENHEIM FOUNDATION

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TES 928 FIELD 7D,20J, 7B

APPLICATION OF X-RAY DIFFRACTION TECHNIQUES TO STRUCTURAL PROBLEMS IN INORGANIC CHEMISTRY

R. SCHAEFER

4/65- 3/66

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UT 515 FIELD 7A, 7B

SOLID SOLUTIONS IN HYDROTHERMALLY SYNTHESIZED SULPHIDES

W. M. BARNARD

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RESEARCH CORP-WILLIAMS-WATERMAN FUND

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UT 524 FIELD 7D,20J, 7B

VIBRATIONALLY INDUCED INTERACTIONS IN COPPER BETA-DIKETONATES

J. W. CARMICHAEL

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UT 529 FIELD 7C

UNIVERSITY OF FLORIDA, GRADUATE SCHOOL, CHEMISTRY, FLORIDA

THE CHEMISTRY OF NATURAL PRODUCTS

J. A. DEYRUP

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UT 533 FIELD 7D,20M,20L, 7B

CLEMSON UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, SOUTH CAROLINA

THE ABSORPTION OF GASES BYSOLID TRANSITION METAL COMPOUNDS

J. C. FANNING, J. K. SULLIVAN

9/65- 8/66

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UT 537 FIELD 7A, 7D, 7B

HOWARD UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, DIST OF COLUMBIA

KINETIC STUDY OF THE PHOTOCHEMICAL OXIDATION OF CYANOGEN BY OXYGEN

M. A. GUILLORY

9/65- 8/66

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UT 540 FIELD 7C, 7B

UNIVERSITY OF WYOMING, GRADUATE SCHOOL, CHEMISTRY, WYOMING

A STUDY OF THE FACTORS RESPONSIBLE FOR SECONDARY HYDROGEN ISOTOPE EFFECTS

G. W. KLEIN

9/65- 8/66

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UT 542 FIELD 7C, 7A, 7D,20J

UNIV OF CAL-L. A., GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

OPTICAL ACTIVITY IN HETEROCYCLIC SYSTEMS

D. A. LIGHTNER

9/65- 8/66

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UT 546 FIELD 7C

THE CHEMISTRY OF AMINO RADICALS

C. J. MICHEJDA

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UT 550 FIELD 7C, 7D,20J, 7B

INVESTIGATION OF CERTAIN HYDROXYCOUMARIN DERIVATIVES AS FLUOROMETRIC METAL ION REAGENTS

R. L. OLSEN

9/65- 8/66

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UT 565 FIELD 7C, 7D

THE PREPARATION AND CHEMISTRY OF SOME HINDERED DIVINYL ETHERS

B. C. WEBERG

9/65- 8/66

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UT 568 FIELD 7C, 5A,20L, 7B

LATTICE PARAMETERS AND DIELECTRIC CONSTANTS OF ISOTOPIC ALLOYS OF LIH AND LID

W. B. ZIMMERMAN

9/65- 8/66

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ZBA 2100 1 FIELD 7C, 7D,20F,20L

USDC, NATL BUR STAN, DIST OF COLUMBIA

STANDARD X-RAY DIFFRACTION PATTERNS FOR CHEMICAL ANALYSIS

H. E. SWANSON

NBS-0907-40-09172
/64- /

COMMERCE-NATIONAL BUREAU OF STANDARDS

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ZPE 1475 FIELD 7C, 7D, 7A

US, AEC, ORNL, ONAL LAB, TENNESSEE

DIMERIZATION OF FROZEN SOLUTIONS OF THYMINE BY ULTRAVIOLET IRRADIATION

M. FUCHTBAUER, P. MAZUR

W-7405-ENG-26
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AEC-BIOLOGY + MEDICINE

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ZPE 1488 FIELD 7C, 7D, 7A, 7B

US, AEC, ORNL, ONAL LAB, TENNESSEE

RE-PAIRING OF LONG-LIVED FREE RADICALS

M. L. RANDOLPH, M. G. MILLER

W-7405-ENG-26
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AEC-BIOLOGY + MEDICINE

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ZPE 1714 FIELD 7C, 7D, 7B

US, AEC, ORNL, ONAL LAB, TENNESSEE

INTERACTION OF RADIATION WITH GASES

G. S. HURST, T. E. BORTNER
L. G. CHRISTOPHOROU, R. N. COMPTON

F. J. DAVIS, C. E. KLOTS, P. W. REINHARDT

W-7405-ENG-26
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AEC-BIOLOGY + MEDICINE

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ZPE 1721 FIELD 7D, 7A,18A

US, AEC, ORNL, ONAL LAB, TENNESSEE

SPECIFIC ACTIVITY

B. C. PATTEN

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AEC-BIOLOGY + MEDICINE

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ZPE 1728 FIELD 7D, 7A,18A

US, AEC, ORNL, ONAL LAB, TENNESSEE

SPECIFIC ACTIVITY

B. C. PATTEN

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AEC-BIOLOGY + MEDICINE

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ZPE 1883 FIELD 8D, 7B

US, AEC, ORNL, ONAL LAB, TENNESSEE

MOLLUSK STUDIES

D. J. NELSON

W-7405-ENG-26
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ZQA 15 FIELD 7C, 7D,20M,11B

USA, ORD CORPS, ROCK ISL ARSNL, ILLINOIS

REACTIONS OF POTENTIALLY SUITABLE VCI WITH NON-FERROUS METALS AND NON-METALS

P. MARTIN

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 137 1 FIELD 13B, 7C, 7D, 8C

USA, CHEM CORPS, EDGEWOOD ARSENAL, MARYLAND

RADIOCHEMISTRY RESEARCH

C. CRISCO, J. BOGDAN, H. LADA

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ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQN 544126 5 FIELD 7A, 7D,11F,11C

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

PHYSICAL CHEMISTRY

H. PORTE, W. S. HAYNES

/65- /

DOD-NAVY

****

ZT 130 FIELD 7C, 7D, 7B

TENN VALLEY AUTHORITY, TENNESSEE

HIGH-TEMPERATURE ACTIVATION OF CHEMICAL REACTIONS

E. P. EGAN

B13N03
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TENNESSEE VALLEY AUTHORITY

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ZVA 128 FIELD 7C, 7D

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

DETERMINATION OF INTERMEDIATES IN D+C RED NO. 21 AND D+C RED NO. 22

C. GRAICHEN, K. A. FREEMAN, N. H. WATKINS

FDA-V-011-02
/65- /

HEW-FOOD + DRUG ADMINISTRATION

****

ZVA 152 FIELD 7C, 7D

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

PREPARATION OF 4 - 2-CHLORO-4-NITROPHENYLAZO - -1-NAPHTHOL

C. GRAICHEN, P. BULHACK, K. A. FREEMAN

FDA-V-019-01
/66- /

HEW-FOOD + DRUG ADMINISTRATION

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ZVA 153 FIELD 7C, 7D

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

DETERMINATION OF 2,4,6-TRIBROMORESORCINOL IN D+C RED NO. 27

C. GRAICHEN, K. A. FREEMAN, N. H. WATKINS

FDA-V-018-01
/66- /

HEW-FOOD + DRUG ADMINISTRATION

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ZVA 236 FIELD 7C, 7D

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

DETERMINATION OF SUBSIDIARY DYES IN D+C ORANGE NO. 17

C. GRAICHEN, P. BULHACK, K. A. FREEMAN

FDA-V-020-02
/66- /

HEW-FOOD + DRUG ADMINISTRATION

****

ZVA 237 FIELD 7C, 7D

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

PREPARATION OF 4 - 2,4-DINITROPHENYLAZO - -1-NAPHTHOL

C. GRAICHEN, P. BULHACK, K. A. FREEMAN

FDA-V-020-01
/66- /

HEW-FOOD + DRUG ADMINISTRATION

****

ZVA 249 FIELD 7C, 7D

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

INTERMEDIATES IN D+C VIOLET NO. 2

W. LINK, C. STEIN

FDA-V-017-02

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HEW-FOOD + DRUG ADMINISTRATION

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ZVA 274 FIELD 7C, 7D

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

CHROMATOGRAPHIC SEPARATION OF COSMETIC INGREDIENTS

S. H. NEWBURGER, H. M. DAVIS
W. STEVENSON

FDA-2-1001-IIIA
/65- /

HEW-FOOD + DRUG ADMINISTRATION

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ZVA 275 FIELD 7C, 7D

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

ANALYSIS OF ARYLAMINE OXIDATION HAIR DYES

S. H. NEWBURGER, A. ANDREWES
C. KOTTEMANN

FDA-2-1003-IIIA
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HEW-FOOD + DRUG ADMINISTRATION

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ZVA 276 FIELD 7C, 7D,12A

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

PERFUMES, FLAVORS, AND THEIR INGREDIENTS

M. DOLINSKY, J. WENNINGER, R. YATES

FDA-2-2001-IIIA
/65- /

HEW-FOOD + DRUG ADMINISTRATION

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ZVA 278 FIELD 7D, 7C, 7B

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

CLASSICAL CHEMICAL METHODS

K. S. HEINE, C. HOZDIC

FDA-2-3002-IIIA
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HEW-FOOD + DRUG ADMINISTRATION

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ZVA 286 FIELD 7C, 7D, 7B

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

PURIFICATION AND SYNTHESIS OF MODEL ORGANIC COMPOUNDS

E. P. RAGELIS, N. DUY, E. O. HAENNI
J. W. HOWARD, E. LUSTIG

FDA-3-1007-IE
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HEW-FOOD + DRUG ADMINISTRATION

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ZVA 450 FIELD 7C, 7D, 7B

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

SEPARATION OF SYNTHETIC ORGANIC COLORS IN NAIL POLISHES AND ROUGES BY THIN LAYER CHROMATOGRAPHY

C. GRAICHEN, K. A. FREEMAN
A. L. MARCOTTE, W. S. MARIS
N. H. WATKINS

FDA-V-003-03
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HEW-FOOD + DRUG ADMINISTRATION

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ZVA 451 FIELD 7C, 7D

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

DETERMINATION OF INTERMEDIATES IN D+C RED NO. 21 + D+C RED NO. 22

C. GRAICHEN, P. BULHACK, K. A. FREEMAN
W. MARIS

FDA-V-011-01
/65- /

HEW-FOOD + DRUG ADMINISTRATION

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ZVA 452 FIELD 7C, 7D

USDHEW, FOOD + DRUG AD, DIST OF COLUMBIA

DETERMINATION OF INTERMEDIATES IN ORANGE B

C. GRAICHEN, K. A. FREEMAN, H. YOUNG

FDA-V-021-01
/65- /

HEW-FOOD + DRUG ADMINISTRATION

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ZVA 32237 FIELD 7C, 7D, 7B

USDA, OLUSTEE, FLORIDA

CHEMICALS FROM TERPENES AND RESIN ACIDS BY FREE RADICAL ADDITION

G. S. FISHER

AG-SOS-02-057
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AGRICULTURE-DEPT OF AGRICULTURE

09 ELECTRONICS AND ELECTRICAL ENGINEERING

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GQF 258541 2 FIELD 9+,12A, 9C,20I

CASE INST OF TECHNOL, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, OHIO

STUDY OF EM WAVES IN ANISOTROPIC MEDIA + NETWORK SYNTHESIS ANALYSIS

R. E. COLLIN

AF-19-628-01699
/65- /

DOD-AIR FORCE

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GSE 934 FIELD 13+, 9+,12A,18A

UNIVERSITY OF FLORIDA, SCHOOL OF ENGINEERING, NUCLEAR ENGINEERING, FLORIDA

PERIPHERAL EQUIPMENT FOR A SMALL DIGITAL COMPUTER

R. E. UHRIG

GK-677
11/65-10/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 959 FIELD 9+, 9C, 9A

OHIO STATE UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, OHIO

LOW-ENERGY SPREAD ELECTRON BEAMS

E. M. BOONE

GK-800
2/66- 1/67

NSF-ENGINEERING SCIENCES DIVISION

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ZKD 444 FIELD 1E,12A,22C

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DEVELOPMENT OF ADVANCED TECHNIQUES FOR COMPUTER DIAGNOSTICS

K. J. COHEN

FAA-120-233
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

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ZQF 260551 FIELD 9C, 9+, 9A,20C

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

INTERACTION OF MISSILE ANTENNA SYSTEMS WITH IONIZED FLOW FIELDS

R. J. PAPA

/65- /

DOD-AIR FORCE

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ZQF 260554 FIELD 9+, 9A,12A, 9C

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

DYNAMIC DATA PROCESSING METHODOLOGY

C. M. WALTER

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DOD-AIR FORCE

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ZQN 544181 5 FIELD 15+, 9+, 9C, 9A

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

LOSSY COATINGS FOR ELECTRICAL TRANSMISSION LINES TO ATTENUATE EMI RADIATION

D. B. CLARK, W. D. PLUM

/65- /

DOD-NAVY

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ZT 165 FIELD 9+, 9C

TENN VALLEY AUTHORITY, TENNESSEE

TIE LINE TRIPPING

C. MCCORD, J. A. BRADLEY

/66- /

TENNESSEE VALLEY AUTHORITY

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ZT 166 FIELD 9+, 9C, 9A

TENN VALLEY AUTHORITY, TENNESSEE

RELAYING FOR SINGLE-POLE RECLOSING ON EHV LINES

C. MCCORD, J. A. BRADLEY

/66- /

TENNESSEE VALLEY AUTHORITY

10 ENERGY CONVERSION (NON-PROPULSIVE)

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PAR 7 FIELD 9+, 9C, 9A,11B

THERMO ELECTRON ENGR, MASSACHUSETTS

APPLICATION OF GAS THERMIONICS

L. J. LAZARIDOS; L. A. SARKES

ZT-35
1/66-12/66

ASSOCIATION OF AMERICAN RAILROADS

••••••••••

PAR 9 FIELD 7D,21D, 7A, 9C

INST OF GAS TECHNOLOGY, ILLINOIS

DEVELOPMENT OF MOLTEN CARBONATE FUEL CELL

B. BAKER, L. SARKES

ZB-56
1/66-12/66

ASSOCIATION OF AMERICAN RAILROADS

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GQF 207569 FIELD 9C,10B,20I

NEW YORK UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

ELECTRO-BALLISTIC GENERATOR STUDY

S. HASINGER

/65- /

DOD-AIR FORCE

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3QN 530501 FIELD 7C,20M,15+, 9C

IIT RESEARCH INSTITUTE, AT ILL INST OF TECHNOL, ILLINOIS

THERMOREGENERATIVE GALVANIC CELL

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NOW650431C
/65- /

DOD-NAVY

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GSE 943 FIELD 20M, 9C,20D,20K

UNIV OF CAL-L. A., SCHOOL OF ENGINEERING, ENGINEERING, CALIFORNIA

FUNDAMENTAL STUDIES OF SOLAR-THERMAL CONVERSION METHODS

D. BUCHBERG, D. K. EDWARDS

GK-799
2/66- 1/67

NSF-ENGINEERING SCIENCES DIVISION

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GSE 1070 FIELD 10B,20I

WEST VIRGINIA UNIV, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, WEST VIRGINIA

PLASMA GENERATOR

E. J. STEINHARDT

GK-864
2/66- 1/67

NSF-ENGINEERING SCIENCES DIVISION

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ZT 170 FIELD 10B

TENN VALLEY AUTHORITY, TENNESSEE

STEAM SURFACE CONDENSERS - STEAM PLANTS

J. R. PARRISH, R. H. DUNHAM

/66- /

TENNESSEE VALLEY AUTHORITY

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ZT 175 FIELD 20L,20D,10B

TENN VALLEY AUTHORITY, TENNESSEE

DRAFT SYSTEMS - STEAM PLANTS

J. R. PARRISH, R. E. LYON

/66- /

TENNESSEE VALLEY AUTHORITY

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ZT 176 FIELD 20D,10B

TENN VALLEY AUTHORITY, TENNESSEE

CIRCULATING WATER SYSTEMS - STEAM PLANTS

J. R. PARRISH, C. W. BULIEAU
R. H. DUNHAM

/66- /

TENNESSEE VALLEY AUTHORITY

11 MATERIALS

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GQF 6730 1 FIELD 13H,11G,11F,20L

SOUTHWEST RES INST, TEXAS

EVALUATION OF METAL FATIGUE BY ULTRASONIC AND MAGNETIC TECHNIQUES

W. L. DONALDSON

AF-49-638-01502
/65- /

DOD-AIR FORCE

••••••••••

GQF 258009 3 FIELD 22B,22A,22D, 4A

GENERAL ELECTRIC CO, ITHACA, NEW YORK

DEVELOPMENT + FABRICATION OF SPARE PAYLOAD FOR SATELLITE-TO-SATELLITE DUCTING EXPERIMENT

C. ROBERTS

AF-19-628-05102
/65- /

DOD-AIR FORCE

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GQF 284728 3 FIELD 11F,13H,11G,20L

TECH HIGH SCH IN VIENA, AUSTRIA

MAGNETIC MANGANESE - RARE EARTH ALLOYS

F. LIHL

AF-61-052-00609
/65- /

DOD-AIR FORCE

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GSE 932 FIELD 11F,11G

COLUMBIA UNIVERSITY, SCHOOL OF ENGINEERING, MIN METAL + MIN ENGIN, NEW YORK

VACANCY CLUSTERS IN METALS

J. M. GALLIGAN

NSF-GK-752
1/66- 1/67

NSF-ENGINEERING SCIENCES DIVISION

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GSE 945 FIELD 11F,11G

UNIV OF KENTUCKY, SCHOOL OF ENGINEERING, METALLURGICAL ENGIN, KENTUCKY

RESEARCH INITIATION - STRUCTURAL CHARACTER OF SUPERPLASTIC ALUMINUM ALLOYS

R. J. DEANGELIS

GK-963
2/66- 1/67

NSF-ENGINEERING SCIENCES DIVISION

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GSE 948 FIELD 11F,13H,11G

VANDERBILT UNIVERSITY, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, TENNESSEE

RESEARCH INITIATION - CORRELATION OF FATIGUE AND RESIDUAL STRESS IN METALS

R. S. GOODRICH

GK-955
2/66- 1/67

NSF-ENGINEERING SCIENCES DIVISION

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GSE 951 FIELD 20M,11F,11G,20L

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, TEXAS

RESEARCH INITIATION - GRAIN BOUNDARY DIFFUSION

J. P. STARK

GK-957
2/66- 1/67

NSF-ENGINEERING SCIENCES DIVISION

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GSE 1040 FIELD 11G

UNIV OF SOUTH CAROLINA, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, SOUTH CAROLINA

DYNAMIC YIELD STRESS OF METALS BY MEANS OF STRESS WAVE AMPLIFICATION

N. P. SUH

GK-899
3/66- 2/67

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GYE 890168 FIELD 7C, 7D,20M,11G

SHRI RAM INST IND RES, INDIA

TOTALLY ACETYLATED CASTOR OIL FOR USE AS PLASTICIZERS

R. K. BHATNAGAR

AGF-A07-UR-107
1/66-12/66

AGRICULTURE-DEPT OF AGRICULTURE

••••••••••

ZQA 175 FIELD 20M,11B,11G,11C

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

THERMAL AND ELASTIC-PLASTIC STRESS IN COMPOSITE TUBES

J. ZWEIG

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 198 FIELD 7C,11G, 7B

USA, ORD CORPS, ROCK ISL ARSNL, ILLINOIS

INJECTION MOLDING OF ELASTOMERS

J. RUBY

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 220 FIELD 7C, 7D,11G,11H

USA, ORD CORPS, ROCK ISL ARSNL, ILLINOIS

EVALUATION OF NEW DEVELOPMENTS IN LUBRICATION FOR ARMY USE

M. FISHER

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQA 224 FIELD 7C, 7D,11G,11C

USA, ORD CORPS, ROCK ISL ARSNL, ILLINOIS

DEVELOP MORE RELIABLE ACCELERATED LAB TESTS FOR CORROSION PREVENTIVES

R. JOHNSON

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQN 544197 FIELD 11C,11F,11G,20K

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

LABORATORY INVESTIGATION OF UNDERWATER CURING EPOXIES

R. W. URISKO

/65-

DOD-NAVY

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ZUG 792 FIELD 8D, 8G,11B, 5A

USDI, BUR MINES, ALBANY, OREGON

BENEFICIATION OF IDAHO KYANITE

A. H. ROBERSON, W. A. STICKNEY
G. V. SULLIVAN

INT-BM-111411-COMP-5
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 793 FIELD 11F,13H

USDI, BUR MINES, ALBANY, OREGON

SLAB-SHAPED TITANIUM INGOTS BY CULD-MOLD ARC MELTING

A. H. ROBERSON, S. L. AUSMUS, R. A. BEALL

INT-BM-6-41H1-1100
/65- /

INTERIOR-BUREAU OF MINES

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ZUG 796 FIELD 7D,20M,11B,20L

USDI, BUR MINES, ALBANY, OREGON

HIGH TEMPERATURE MATERIALS OF CONSTRUCTION, THE SYSTEM Al4C3-AlN-Al2O3

A. H. ROBERSON, J. L. HENRY, H. J. KELLY
J. H. RUSSELL

INT-BM-111411-COMP16
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INTERIOR-BUREAU OF MINES

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ZUG 798 FIELD 13H

USDI, BUR MINES, S.L.C., UTAH

SILVER METALLURGY RESEARCH

B. H. CLEMMONS, R. O. DANNENBERG
R. HAVENS, J. M. MAURICE, G. M. POTTER
G. A. SMYRES

INT-BM-111461-2
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INTERIOR-BUREAU OF MINES

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ZUG 799 FIELD 5A,11F,13H

USDI, BUR MINES, S.L.C., UTAH

RECOVERY OF COPPER AND BYPRODUCTS FROM SOUTHWESTERN ORES

B. H. CLEMMONS, P. A. BLOOM, L. G. EVANS
R. D. GROVES, S. J. HUSSEY
W. A. MCKINNEY, B. K. SHIBLER

INT-BM-111461-3
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INTERIOR-BUREAU OF MINES

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ZUG 801 FIELD 11F,13H

USDI, BUR MINES, COLLEGE PK, MARYLAND

REMOVAL OF UNDESIRABLE ELEMENTS FROM SCRAP STEEL

F. D. LAMB, H. S. CALDWELL
P. M. SULLIVAN

INT-BM-111421-24
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INTERIOR-BUREAU OF MINES

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ZUG 871 FIELD 7D, 8D, 8G,11B

USDI, BUR MINES, TUSCALOOSA, ALABAMA

BIOTITE-MUSCOVITE SEPARATION

F. J. CSERVENYAK, R. R. ADAIR
J. S. BROWNING

INT-BM-111471-1
/66- /

INTERIOR-BUREAU OF MINES

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ZYA 21139 FIELD 7C, 7D,11H,11C

USDA, WYNDMOOR, PENNSYLVANIA

SYNTHETIC LUBRICANTS FROM HETEROCYCLIC DERIVATIVES OF ANIMAL FATS

G. MAERKER

AG-E06-03-083
/66- /

AGRICULTURE-DEPT OF AGRICULTURE

12 MATHEMATICAL SCIENCES

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GQF 6886 1 FIELD 12A

ILLINOIS INST OF TECH, GRADUATE SCHOOL, MATHEMATICS, ILLINOIS

THEOREM PROVING BY COMPUTER

B. KALLICK

AF-49-638-01458
/65- /

DOD-AIR FORCE

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GSE 909 FIELD 12A,13M,20K

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, ENGINEERING MECHANICS, CALIFORNIA

STRUCTURAL RELIABILITY USING LIMITED PROBABILITY DISTRIBUTIONS

J. R. BENJAMIN

NSF-GK-745
12/65-12/66

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GSS 1172 FIELD 12A

BASIC INVESTIGATIONS ON LOGIC OF SUBJUNCTIVE CONDITIONALS - QUANTIFICATION THEORY AND SET THEORY

R. B. ANGELL, R. L. WILSON

NSF-GS-630
1/65- 1/66

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GSS 1220 FIELD 12A

UNIV OF PITTSBURGH, GRADUATE SCHOOL, PHILOSOPHY, PENNSYLVANIA

MATHEMATICAL LOGIC

N. D. BELNAP, A. R. ANDERSON

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GSS 1249 FIELD 12A

THE LOGICAL FOUNDATIONS OFSTATISTICAL INFERENCE

H. E. KYBURG

NSF-GS-708
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NCA 38 FIELD 13F,12A, 9D

MASS DATA ANALYSIS

H. W. CASE, R. BRENNER, W. W. MOSHER

2/65- 2/66

CALIFORNIA, UNIVERSITY OF-ALL BRANCHES

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NCA 45 FIELD 13F,12A, 5C

ROUTINES FOR CURVE FITTING AND STATISTICAL ANALYSIS

H. W. CASE, H. G. REICHENBACH

10/64-10/65

CALIFORNIA, UNIVERSITY OF-ALL BRANCHES

13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

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7GX 138 3 1 FIELD 13A, 7D, 7B

RUTGERS THE STATE UNIV, GRADUATE SCHOOL, CHEMISTRY, NEW JERSEY

FUNDAMENTALS OF AIR CLEANING BY ADSORPTION PROCESSES

M. J. LOW, M. SHIMIZU

7-AP-00211-03
7/65- 5/66

PHS-BSS

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7GX 600 7 FIELD 13B, 5A, 8H

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7GX 765 3 FIELD 13A, 7D,20M,2C

PENNSYLVANIA ST UNIV, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, PENNSYLVANIA

BASIC STUDY OF AIR POLLUTION CONTROL WET-SCRUBBERS

S. CALVERT

7-AP-00320-03
7/65- 8/66

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7GX 867 1 FIELD 13A,20L

UNIVERSITY OF FLORIDA, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, FLORIDA

BEHAVIOR OF AEROSOL PARTICLES

R. S. SHOLTES

7-AP-00493-01
2/66- 1/67

PHS-BSS

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7GX 1209 1 FIELD 13A,13B

PARTICULATE EMISSIONS FROM WOOD WASTE COMBUSTION

R. W. BOUBEL

7-AP-348-01A2
12/65-11/66

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7GX 1274 2 FIELD 13B,12A, 5C

UNIVERSITY OF IOWA, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, IOWA

OXYGEN USE RATES IN ACTIVATED SLUDGE SYSTEMS

H. S. SMITH, O. B. MCDONALD

7-WP-00695-02
9/65- 8/66

PHS-BSS

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7GX 1563 1 FIELD 13A, 7D, 8G, 5A

ST. LOUIS UNIVERSITY, GRADUATE SCHOOL, PHYSICS, MISSOURI

ANALYSIS OF ATMOSPHERIC DUST BY ELECTRON OPTICS

H. U. RHOADS
(7AP-00372-01)
2/66- 1/67

PHS-BSS

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7GX 1659 2 FIELD 13A,11A,11C

CITY, AIR POLL CNT BUR, CINCINNATI, OHIO

PARTICULATE SAMPLING BY ADHESIVE COATED MATERIALS

C. W. GRUBER, C. E. SCHUMANN

7-AP-00370-02
10/65- 9/66

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7GX 1805 2 FIELD 7C, 7D, 8H, 8G

UNIV OF PITTSBURGH, SCHOOL OF PUBLIC HLTH, PUBLIC HEALTH ADMIN, PENNSYLVANIA

SORPTION OF HEAVY METAL RADIONUCLIDES BY MINERALS

M. A. SHAPIRO, J. B. ANDELMAN, I. YU

7-RH-00322-02-S-1
6/65- 5/66

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7GX 3025 1 FIELD 13A, 8+, 9+

ATMOSPHERIC RES GROUP, ALTADENA, CALIFORNIA

RADAR MEASUREMENTS OF THE MIXING LAYER OVER CITIES

T. R. MEE, M. T. GANNON, E. K. KAUPER

7-AP-00433-01
12/65-11/66

PHS-BSS

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7GX 3211 1 FIELD 13A,13B, 7D, 7B

LOYOLA UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

STUDY OF AIR POLLUTANTS BY ABSORPTION SPECTROSCOPY

C. E. MOORE

7-AP-00444-01
12/65-11/66

PHS-BSS

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7ZX 4092 1 FIELD 13A, 7D

USDHEW BSS ENGIN CTR, SANI ENG CTR,CINCINNAT, OHIO

COMPARISON OF METHODS OF MEASURING PARTICULATE EMISSIONS IN STACK GAS

S. HOCHHEISER, W. BASNAGILL, M. NOLAN

BSS-0-3
/66- /

PHS-BSS

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GQN 544105 5 FIELD 11F,13H,11G

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

WELDING PROCEDURES

W. H. MUNSE

NBY24976
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DOD-NAVY

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GQN 544230 FIELD 12A, 5C

EFFECTS OF EPS AND MAE RATING ON BACKLOG OF ESSENTIAL MAINTENANCE

E. BEAN

NBY62168
/65- /

DOD-NAVY

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GR 69 FIELD 13F

REDESIGN + RECONSTRUCTION OF 2-BLOCK SECTION OF DOWNTOWN-F STREET AREA

W. N. TOBRINER

/66- /

HOUSING AND HOME FINANCE AGENCY

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GR 74 FIELD 13B

TO DEMONSTRATE HOW BLIGHTING EFFECT OF CHANGING SUBSOIL CONDITIONS MAY BE CORRECTED

J. G. BONHAM

/66- /

HOUSING AND HOME FINANCE AGENCY

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GR 75

REHABILITATION + PRESERVATION OF HISTORIC COMMERCIAL AREAS

M. BAPTISTA

/66- /

HOUSING AND HOME FINANCE AGENCY

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GR 81 FIELD 13B

METHODS OF PREVENTING FAILURE OF SEPTIC TANK PERCOLATION FIELDS

NONE

4-52
/65- /

HOUSING AND HOME FINANCE AGENCY

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GR 82 FIELD 13B

NATL ACAD SCI NAT RE, DIST OF COLUMBIA

CRITERIA NEEDED FOR ESSENTIAL SOIL TESTS

• NONE

5-10
/65- /

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GR 83 FIELD 13G,13B

NATL ACAD SCI NAT RE, DIST OF COLUMBIA

SLOPE STABILITY RATIOS AND EROSION CONTROL

[redacted]

9-13
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GR 86 FIELD 13F,11G

USDC, NATL BUR STAN, DIST OF COLUMBIA

STUDY OF EXTERIOR WALL SYSTEMS AND CONSTITUENT MATERIALS AND COMPONENTS

, NONE

6-29
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GSE 256 3 FIELD 13B

CAL INST OF TECHNOLOGY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, CALIFORNIA

CONSTITUTIVE RELATIONS FOR SOILS

R. F. SCOTT

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GSE 925 FIELD 13G,12A,13M,20L

UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, MICHIGAN

TRANSIENT FLOW THROUGH CLOSED CONDUITS

V. L. STREETER

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GSE 928 FIELD 11F,13H,13I,11G

GEORGIA INST OF TECH, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, GEORGIA

CHIP FORMATION AND THE MECHANICS OF METAL CUTTING

J. A. BAILEY

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GSE 939 FIELD 10B

SYRACUSE UNIVERSITY, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, NEW YORK

CRYOGENIC THERMAL REGENERATOR INVESTIGATION

W. E. GIFFORD, R. W. HEIMBURG

GK-798
2/66- 1/67

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GSE 942 FIELD 12A,13M,20D

STABILITY OF A LIQUID HEATED FROM BELOW

T. V. DAVIES

GK-946
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GSE 982 FIELD 20D,20K

GEORGIA INST OF TECH, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, GEORGIA

HEAT TRANSFER SYSTEMS CONSISTING OF WATER-AIR SPRAY COMPOSITIONS

J. E. SUNDERLAND

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1/66-12/66

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GSE 1018 FIELD 13G,20L,20D,10B

UNIV OF WASHINGTON, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, WASHINGTON

MATERIAL REMOVAL BY ABRASIVE PARTICLES IN AN AIR STREAM

J. WOLAK

GK-948
3/66- 2/67

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GSE 1031 FIELD 13G,13B

UNIV OF CAL-L. A., SCHOOL OF ENGINEERING, ENGINEERING, CALIFORNIA

THE EFFECT OF HIGH CONFINING PRESSURE ON THE DEFORMATION OF SOIL

K. L. LEE

GK-921
3/66- 2/67

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GSE 1046 FIELD 13B

VANDERBILT UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, TENNESSEE

DEWATERING OF SEWAGE SLUDGE ON GRANULAR MATERIALS

J. H. NEBIKER

GK-924
3/66- 2/67

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GSE 1048 FIELD 20D

WASHINGTON UNIVERSITY, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, MISSOURI

HEAT TRANSFER IN A TRIANGULAR DUCT WITH ONE HEATED SIDE

A. W. BLACK

GK-849
2/66- 1/67

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GSS 777 FIELD 5A,13H

NEW YORK UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

THE TECHNOLOGY OF GOLDWORKING IN THE ANCIENT WORLD

S. Z. LEWIN, P. F. DAVIDSON

NSF-GS-887
5/65- 4/66

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GUW 341 FIELD 13G,13B, 8H,12A

VIRGINIA POLYTECH INST, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, VIRGINIA

QUEUEING MODEL FOR POLLUTION TRANSPORT IN STREAMS

F. E. MCJUNKIN

INT-WR-A-007-VA
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INTERIOR-OFFICE OF WATER RESOURCES

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NCA 39 FIELD 13F,12A, 5C

MATHEMATICAL ANALYSIS OF ACCIDENTS

H. W. CASE, F. A. HAIGHT

11/64-11/65

CALIFORNIA, UNIVERSITY OF-ALL BRANCHES

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NCA 41 FIELD 13F,13B

MACROSCOPIC TRAFFIC FLOW THEORY

H. W. CASE, R. BRENNER, W. W. MOSHER

11/64-11/65

CALIFORNIA, UNIVERSITY OF-ALL BRANCHES

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NCA 44 FIELD 13F,13B

THE INTERFACE BETWEEN TRANSPORTATION AND LAND USE PLANNING IN URBAN REGIONS

H. W. CASE, R. BRENNER, W. W. MOSHER

10/64-10/65

CALIFORNIA, UNIVERSITY OF-ALL BRANCHES

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NGI 34 FIELD 13F,12A,22C

GEORGIA INST OF TECH, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, GEORGIA

NONSTATIONARY RANDOM INPUTS AND RESPONSES

M. C. BENARD, R. P. CHEN

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GEORGIA INSTITUTE OF TECHNOLOGY

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NGI 36 FIELD 21D, 7D

GEORGIA INST OF TECH, SCHOOL OF ENGINEERING, ENGIN EXPT STATION, GEORGIA

INDUSTRIAL PRODUCTS DEVELOPMENT

W. H. BURROWS, W. R. TOOKE

1/66- 1/67

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NUS 63 FIELD 13G, 8H

SUBMERGED PARSHALL FLUMES

G. V. SKOGERBOE, M. L. HYATT

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UTAH STATE UNIVERSITY

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PAN 2 FIELD 20K

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, TEXAS

STATIC TESTS OF COMPOSITE STEEL-CONCRETE BEAMS

A. A. TOPRAC, J. W. HALL

/66- /

AMERICAN IRON + STEEL INSTITUTE

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PAR 1 FIELD 10B

DEVELOPMENT OF NATURAL GAS PRESSURE BOOSTER PUMP

C. MARTIN, R. LYNN, R. TUPA

1/66-12/66

ASSOCIATION OF AMERICAN RAILROADS

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PAR 2 FIELD 7D,12A, 5C,13F

INST OF GAS TECHNOLOGY, ILLINOIS

NATURAL GAS FUELED COOLING METHODS AND SYSTEMS

W. F. RUSH, R. ROSENBERG, S. WEIL

1/66-12/66

ASSOCIATION OF AMERICAN RAILROADS

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PAR 12 FIELD 10B

GAS APPLIANCE DESIGN FOR USE OF ELEVATED GAS PRESSURES

E. J. WEBER

1/66-12/66

ASSOCIATION OF AMERICAN RAILROADS

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PAR 13 FIELD 20D,10B

DESIGN OF GAS APPLIANCES FOR OUTDOOR INSTALLATION

D. W. DEWERTH

1/66-12/66

ASSOCIATION OF AMERICAN RAILROADS

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PAR 14 FIELD 10B

GAS RANGE IMPROVEMENT PROGRAM

E. H. PERRY, R. C. GEHRKE

1/66-12/66

ASSOCIATION OF AMERICAN RAILROADS

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PAT 2 FIELD 11F,13H,13I

GEORGIA INST OF TECH, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, GEORGIA

TEMPERATURE DISTRIBUTION IN THE CHIP AND TOOL DURING MACHINING

J. A. BAILEY, C. R. ATTAWAY

1/66-12/66

AMERICAN SOC OF TOOL + MFG ENGR RES FDN

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PHR 4 FIELD 13B,13F,11B,13H

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

DEVELOPMENT OF APPROPRIATE METHODS FOR EVALUATING THE EFFECTIVENESS OF STABILIZING AGENTS

E. J. BARENBERG, E. DANNER

7/64- 6/65

HIGHWAY RESEARCH BOARD

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YCO 122 FIELD 13G

COLORADO STATE UNIV, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, COLORADO

ROBERT LEE DAM SPILLWAY

J. RUFF

9/65-12/65

STATE-COLORADO

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YNM 79 1 FIELD 13G, 8H

NEW MEX INST MIN + TEC, GRADUATE SCHOOL, GROUNDWATER HYDROLOGY, NEW MEXICO

HYDRAULICS OF WELLS

M. S. HANTUSH

/65- /

STATE-NEW MEXICO

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YTX 292 FIELD 13F,10B

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, TEXAS

DEVELOPMENT LENGTH FOR ANCHOR BOLTS

J. E. BREEN, R. TATIKOND

/66- /

STATE-TEXAS

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YTX 293 FIELD 13F,20K

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, TEXAS

STRENGTH EFFECT OF CUTTING OFF TENSION BARS IN CONCRETE BEAMS

P. M. FERGUSON, S. I. HUSAIN, D. W. LEE R. TATIKONDA

/66- /

STATE-TEXAS

•••••••••

YTX 294 FIELD 13F,20K,10B

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, TEXAS

DESIGN CRITERIA FOR OVERHANGING ENDS OF BENT CAPS - BOND AND SHEAR

P. M. FERGUSON, J. E. BREEN, R. TATIKONDA D. VICTOR

/66- /

STATE-TEXAS

•••••••••

YTX 295 FIELD 13F,20K

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, TEXAS

FATIGUE STRENGTH OF 3/4 STUDS IN LIGHTWEIGHT CONCRETE

A. A. TOPRAC, H. G. LEHMAN, H. S. LEW

/66- /

STATE-TEXAS

•••••••••

ZQN 544076

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

IMPROVEMENTS FOR POLAR CAMPS

E. H. MOSER

/65- /

DOD-NAVY

•••••••••

ZQN 544102 FIELD 13F

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

TEST AND EVALUATION OF SUPPORT EQUIPMENT

W. H. BEARD, E. H. MOSER

/65- /

DOD-NAVY

•••••••••

ZQN 544121 3 FIELD 13F,13B,15+,

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

STUDIES MCB CONSTRUCTION OPERATIONS

D. TAYLOR, R. E. JOCHUMS

/65- /

DOD-NAVY

•••••••••

ZQN 544123 2 FIELD 11F,10B

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

MULTI-PURPOSE MOBILE UTILITY PLANT

E. J. BECK, E. H. WOLFF

/65- /

DOD-NAVY

•••••••••

ZQN 544128 FIELD 13F,20K

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

WATERFRONT STRUCTURES - FLOATS

T. T. LEE, J. T. OBRIEN

/65- /

DOD-NAVY

•••••••••

ZQN 544206 FIELD 13F

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

TRANSPORTATION EQUIPMENT ALLOWANCE STUDY

W. L. RICHARDSON, C. E. PARKER

/65- /

DOD-NAVY

•••••••••

ZQN 544223 FIELD 13F,12A, 5C,1

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

TEMPO PLANNING FACTORS FOR MAINTENANCE UTILITIES AND TRANSPORTATION

W. L. RICHARDSON, C. E. PARKER

/65- /

DOD-NAVY

****

ZQN 544225 FIELD 12A

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

SAMPLING PROCEDURE FOR SURVEY OF MAINTENANCE CONDITIONS

G. W. MORRIS

/65- /

DOD-NAVY

****

ZT 137 FIELD 13G, 9C,10B

TENN VALLEY AUTHORITY, TENNESSEE

ECONOMIC DISPATCH

J. H. GILBREATH

/66- /

TENNESSEE VALLEY AUTHORITY

****

ZT 151 FIELD 13A,12A,20K

TENN VALLEY AUTHORITY, TENNESSEE

ULTIMATE STRENGTH DESIGN CHARTS FOR DESIGN OF REINFORCED CONCRETE CHIMNEYS

W. C. BOOP, R. W. CANNON

/66- /

TENNESSEE VALLEY AUTHORITY

****

ZT 153 FIELD 11B

TENN VALLEY AUTHORITY, TENNESSEE

MINIMUM REINFORCEMENT FOR CONTROL OF CRACKING IN CONCRETE

W. C. BOOP, R. W. CANNON

/66- /

TENNESSEE VALLEY AUTHORITY

****

ZT 154 FIELD 20K

TENN VALLEY AUTHORITY, TENNESSEE

EFFECT OF BAR SPACING AND COVER THICKNESS ON SPLICE REQUIREMENT FOR REINFORCING BARS

W. C. BOOP, R. W. CANNON

/66- /

TENNESSEE VALLEY AUTHORITY

****

ZUA 828 FIELD 13B, 8D, 8H

EXPERIMENTAL STUDIES OF ARTIFICIAL RECHARGE OF TREATED SEWAGE THROUGH AN INJECTION WELL

P. COHEN, C. N. DURFOR, J. ISBISTER W. R. MILLER

INT-GS-NY-21-C
/66- /

INTERIOR-GEOLOGICAL SURVEY

****

ZUA 844 FIELD 13G,13B, 8H, 5A

PEAK DISCHARGES OF WATER FROM EXTREMELY SMALL URBAN WATERSHEDS

L. A. MARTENS, R. M. BURTON, A. L. PUTNAM

INT-GS-NC-30-C
/66- /

INTERIOR-GEOLOGICAL SURVEY

****

ZUG 524 1 FIELD 13A,13B,21D, 7C

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

COMPOSITION AND CHARACTERISTIC REACTIONS OF AUTOMOTIVE EXHAUST GAS

B. DIMITRIADES, J. D. CLINGENPEEL B. +. DIMITRIADES, R. D. FLEMING R. W. HURN

BSS-8-6
/65- /

INTERIOR-BUREAU OF MINES

****

ZUG 812 FIELD 5A

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

PRESSURE RELEASE BY WASHER-HELD METAL-PANEL VENTS

J. W. CONN

INT-BMHS-60-16
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 813 FIELD 8C

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

ROOF CONTROL AND SUPPORT LOADS ON PILLAR LINES.

E. A. CURTH, R. H. DITTO

INT-BMHS-30-18
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 817 FIELD 13A, 7D,10B, 7B

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

DEVELOPMENT OF CHROMATOGRAPHIC TECHNIQUES FOR DIESEL EXHAUST ANALYSIS

R. W. FREEDMAN, H. W. LANG

INT-BMHS-20-12
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 836 FIELD 7C,21B, 8D,11C

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

FLAME SPREAD ON CONVEYOR BELTS

E. M. MURPHY

INT-BMHS-60-13
/66- /

INTERIOR-BUREAU OF MINES

****

ZUG 857 FIELD 13B, 7C,21D, 7C

USDI, BUR MINES, DIST OF COLUMBIA

USE OF COAL IN WASTE WATER PURIFICATION - PRODUCTION OF COAL CHARS AS ADSORBENTS FOR WASTE WATER

J. H. FIELD, A. J. FORNEY, G. E. JOHNSON

INT-BM-11114122-10
/66- /

INTERIOR-BUREAU OF MINES

14 METHODS AND EQUIPMENT

****

GQF 207054 5 FIELD 20M,13+, 9+, 9A

MASS INST OF TECHNOL, GRADUATE SCHOOL, MASSACHUSETTS

RESEARCH ON A MAGNETIC MODEL-SUSPENSION AND BALANCE SYSTEM USABLE IN WIND TUNNELS

E. E. COVERT

AF-33-615-01470
/65- /

DOD-AIR FORCE

****

GQF 207434 FIELD 5E, 9C, 9+,20D

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, MASSACHUSETTS

STUDY OF ELECTROMAGNETIC MEANS OF ADDING HEAT AND DIRECTED VELOCITY TO GAS

E. E. COVERT

AF-33-615-02790
/65- /

DOD-AIR FORCE

****

GQF 420553 1 FIELD 7C, 9C, 9+, 9A

GENERAL ELECTRIC CORP, PHILADELPHIA, PENNSYLVANIA

FEASIBILITY STUDY OF HIGH DENSITY SHOCK TUNNEL AUGMENTED BY A MHD ACCELERATOR

C. HARRIS, C. MARSTON

AF-40-600-01091
/65- /

DOD-AIR FORCE

****

GQN 544110 5 FIELD 21B,21I, 7D, 7A

HIGH SPEED DETECTOR DEVICE

J. B. SMITH, E. W. CRAY

NBY24974
/65- /

DOD-NAVY

****

ZPE 1195 FIELD 4A, 6B, 9+,11C

US, AEC, OPER OFFICE, NEW YORK

INSTRUMENTATION FOR ENVIRONMENTAL SURVEYS

R. T. GRAVESON, M. E. CASSIDY, N. LATNER J. M. LEVERETT, V. NEGRO

/66- /

AEC-BIOLOGY + MEDICINE

17 NAVIGATION, COMMUNICATIONS DETECTION AND COUNTERMEASURES

****

GQF 259093 1 FIELD 22A,22C,17G, 9C

MITHRAS INC CAMBRIDGE, MASSACHUSETTS

THEORETICAL STUDY OF METHODS TO AERODYNAMICALLY PRODUCE RF WINDOWS IN A HYPERVELOCITY PLASMA SHEATH

J. A. HILL

AF-19-628-03852
/65- /

DOD-AIR FORCE

****

GQF 259102 1 FIELD 9+, 9A,20F,20I

THEORETICAL + EXPERIMENTAL STUDIES OF THE CHARACTERISTICS OF ANTENNAS IN IONIZED MEDIA

M. P. BACHYNSKI

AF-19-628-04071
/65- /

DOD-AIR FORCE

****

ZKD 436 FIELD 1E

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DEVELOPMENT OF ATC SEPARATION CRITERIA

O. SHAPIRO

FAA-157-003
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

****

ZKD 440 FIELD 1E,12A

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

ATC PROCEDURES - NAS METROPLEX STAGE B

J. P. OBRIEN

FAA-134-511
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

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ZKD 443 FIELD 1C, 1E,17G

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

ATC CONCEPTS FOR SUPERSONIC VEHICLES

J. P. OBRIEN

FAA-150-512
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

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ZKD 451 FIELD 1E,22C,12A, 5C

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

ADVANCED DATA ACQUISITION

P. J. LAROCHELLE

FAA-241-003
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

****

ZKD 475 FIELD 1C,17G,13B

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

V/STOL GUIDANCE EQUIPMENT SYSTEMS

• NONE

FAA-320-103-000
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

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ZKD 478 FIELD 1E,17G

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

SHORT DISTANCE NAVAID REQUIREMENTS

NONE

FAA-330-009
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

****

ZKD 485 FIELD 1B

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

CATEGORY II AND III ILS PERFORMANCE ASSURANCE

• NONE

FAA-320-109-000
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

****

ZKD 492 FIELD 1E,17B,17G

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

LONG TERM PLANNING FOR OCEANIC SYSTEM - L OTOS

S. HIRSHON

FAA-350-104
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

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ZKD 512 FIELD 17G, 1C

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DEVELOPMENT OF DESIGNS FOR NAVIGATION FACILITY SYSTEMS

J. E. CLARK

FAA-440-603
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

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ZKD 553 FIELD 1E,12A,22C

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DATA PROCESSING - NAS METROPLEX STAGE A

A. K. KINGSLEY

FAA-133-221
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

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ZKD 555 FIELD 1E,12A,22C, 5C

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

ATC PROCEDURES - NAS METROPLEX STAGE A

J. P. OBRIEN

FAA-133-511
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

****

ZKD 556 FIELD 1E,12A,22C

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DATA PROCESSING - NAS METROPLEX STAGE B

A. K. KINGSLEY

FAA-134-221
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

****

ZKD 563 FIELD 1E, 1C,22C, 5C

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

IN-SERVICE ATC SIMULATIONS

L. A. ANDERSON

FAA-154-XXX
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

****

ZKD 597 FIELD 1E, 1C

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DEVELOPMENT OF DESIGNS FOR ATC FACILITY SYSTEMS

J. E. CLARK

FAA-440-601
/66- /

FAA-SYSTEMS RES + DEVEL SERVICE

18 NUCLEAR SCIENCE AND TECHNOLOGY

****

SSE 1088 FIELD 12A,20H,18A

NEUTRON-TRANSPORT CALCULATIONS IN CURVED CRITICAL SYSTEMS

P. S. SPANGLER

GK-865
2/66- 1/67

NSF-ENGINEERING SCIENCES DIVISION

****

NGI 25 FIELD 18A

GEORGIA INST OF TECH, SCHOOL OF ENGINEERING, NUCLEAR ENGINEERING, GEORGIA

CORRUGATED-PLATE SPARK COUNTERS

G. G. EICHHOLZ

/66- /

GEORGIA INSTITUTE OF TECHNOLOGY

****

ZPE 1730 FIELD 20M,11B,11G,18A

US, AEC, ORNL, ONAL LAB, TENNESSEE

ENVIRONMENTAL FACTORS AFFECTING GLASS ROD DOSIMETRY

B. G. BLAYLOCK, J. P. WITHERSPOON

W-7405-ENG-26
/66- /

AEC-BIOLOGY + MEDICINE

****

ZUA 810 FIELD 18G,13B, 8D, 8F

HYDROLOGY OF SUBSURFACE WASTE DISPOSAL - NATIONAL REACTOR TESTING STATION, IDAHO

J. T. BARRACLOUGH

PCA-9-FG
/66- /

INTERIOR-GEOLOGICAL SURVEY

19 ORDNANCE

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GQF 207185 3 FIELD 7D,19D, 7A,20J

GENERAL ELECTRIC CO, SCHENECTADY, NEW YORK

INVESTIGATIONS OF STRUCTURE OF GASEOUS DETONATIONS

D. R. WHITE

AF-33-657-07945
/65- /

DOD-AIR FORCE

••••••••••

ZQA 227 FIELD 13F,21D,21I,15+

USA, ORD CORPS, ROCK ISL ARSNL, ILLINOIS

MOBILITY STUDIES FOR ARTILLERY WEAPONS

W. E. HEIDEL

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

••••••••••

ZQA 235 FIELD 7C,19D,21B,21I

USA, ORD CORPS, ABERDEEN PROV GR, MARYLAND

RESEARCH AND APPLICATION IN EXPLOSIVES

F. E. ALLISON

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

20' PHYSICS

••••••••••

GH 1199 1 FIELD 3A,20C, 5A,20I

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, ENGIN SCI + AP PHYSICS, CALIFORNIA

THEORETICAL STUDIES OF TURBULENCE IN PLASMAS

P. A. STURROCK, P. +. STURROCK

NSG-703
9/65- 8/66

NASA

••••••••••

GH 1625 FIELD 5A,18A,20H

UNIVERSITY OF MIAMI, GRADUATE SCHOOL, PHYSICS, FLORIDA

PARTIAL SUPPORT OF THE SECOND CORAL GABLES CONFERENCE ON SYMMETRY PRINCIPLES AT HIGH ENERGY

B. KURSUNOGLU

NGR-10-007-015
1/65- 8/66

NASA

••••••••••

GH 1767 FIELD 13F,20D

FLIGHT SAFETY FOUND, NEW YORK

LISTING AND EVALUATION OF

J. LEDERER

NSR-33-026-001
12/64-11/65

NASA

••••••••••

GPF 14 4 FIELD 18A, 7D, 7B

UNIVERSITY OF KANSAS, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, KANSAS

NUCLEAR STRUCTURE STUDIES OF THE LIGHT AND MEDIUM-LIGHT NUCLEI

R. W. KRONE, L. W. ALEXANDER, D. A. BELL
M. C. BRUELS, G. U. DIN, P. GOLDHAMMER
J. W. GORDON

AT(11-1)1120
12/65-12/66

AEC-DIVISION OF PHYSICAL RES

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GPF 39 3 FIELD 12A, 9D,20H,18A

TEX NUCLEAR CORP AUS, TEXAS

A STUDY OF GAMMA RAYS RESULTING FROM FAST NEUTRON INTERACTIONS

I. L. MORGAN, J. B. ASHE, P. S. BUCHANAN
S. C. MATHUR, D. O. NELLIS, C. V. PARKER
J. STOUT

AT(40-1)2791
11/65-11/66

AEC-DIVISION OF PHYSICAL RES

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GPF 54 4 FIELD 7D, 7A,20M,11B

PURDUE UNIVERSITY, SCHOOL OF ENGINEERING, METALLURGICAL ENGIN, INDIANA

TRANSPORT AND THERMODYNAMIC PROPERTIES OF SOLIDS

R. E. GRACE, M. A. DAYANANDA

AT(11-1)-1436
12/65-11/66

AEC-DIVISION OF PHYSICAL RES

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GPF 107 4 FIELD 20J, 5A,20L, 7B

RENSSELAER POLYTC INST, GRADUATE SCHOOL, PHYSICS, NEW YORK

THEORETICAL RESEARCH ON ELECTRON BEHAVIOR IN CRYSTALS

E. BROWN

AT(30-1)1995
1/66- 1/67

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GPF 298 4 FIELD 12A, 3A,20H,20J

HAVERFORD COLLEGE, UNDERGRADUATE SCHOOL, ASTRONOMY, PENNSYLVANIA

WAVE FUNCTIONS FOR ATOMS AND IONS OF INTERMEDIATE MASS

L. C. GREEN, M. CHEN

AT(30-1)-2934
11/65- 4/66

AEC-DIVISION OF PHYSICAL RES

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GPF 365 2 FIELD 5A,18A,20H,20F

UNIV OF CAL-L. A., GRADUATE SCHOOL, PHYSICS, CALIFORNIA

MESON PHYSICS

R. F. HADDOCK, P. BERARDO, J. A. HELLAND
R. T. LONGO, J. PAHL, G. REID
R. M. SALTER

AT(11-1)34-106
6/65- 8/66

AEC-DIVISION OF PHYSICAL RES

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GPF 465 2 FIELD 11C,11F,11G

UNIVERSITY OF VIRGINIA, SCHOOL OF ENGINEERING, MATERIALS SCIENCE, VIRGINIA

INVESTIGATIONS ON THE BEHAVIOR OF POINT DEFECTS AND DISLOCATIONS

D. KUHLMANNWILSDOR, J. W. MATTHEWS

AT-40-1-3108
9/65- 9/66

AEC-DIVISION OF PHYSICAL RES

••••••••••

GPF 725 4 FIELD 11G,11F,20L,20A

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, METALLURGY, MASSACHUSETTS

ATOMIC ARRANGEMENTS, IMPERFECTIONS AND DIFFUSION

B. L. AVERBACH, M. COHEN

AT-30-1-2879
9/65- 8/66

AEC-DIVISION OF PHYSICAL RES

••••••••••

GPF 756 1 FIELD 11G,20J, 5A,20L

CORNELL UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NEW YORK

ELECTRONIC PROPERTIES OF DEFECTS IN IONIC CRYSTALS

D. B. FITCHEN

AT-30-1-3464
9/65- 9/66

AEC-DIVISION OF PHYSICAL RES

••••••••••

GPF 781 1 FIELD 7D,20M,20D,20L

MARQUETTE UNIVERSITY, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, WISCONSIN

DEFECT STRUCTURES IN NONSTOICHIOMETRIC OXIDES

R. N. BLUMENTHAL, R. +. BLUMENTHAL

AT(11-1)1441
1/66-12/66

AEC-DIVISION OF PHYSICAL RES

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GPF 785 1 FIELD 20M,20J, 5A,20L

UNIV OF CAL-L. A., GRADUATE SCHOOL, PHYSICS, CALIFORNIA

SECOND SOUND IN SOLIDS AND ELECTROABSORPTION STUDIES IN SEMICONDUCTORS

M. CHESTER, W. CANNON, C. COLEMAN

AT(11-1)34-122
1/66-12/66

AEC-DIVISION OF PHYSICAL RES

••••••••••

GGQ 595159 4 FIELD 5A,20M,20L, 7B

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, PHYSICS, NORTH CAROLINA

FERMI SURFACE STUDIES

A. T. STEWART, D. ROCKMORE, P. VARLASHKIN

SD-100
/65- /

DEFENSE-ADVANCED RES PROJECTS AGENCY

••••••••••

GGQ 595160 FIELD 20D, 5A,20M, 7B

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, PHYSICS, NORTH CAROLINA

POSITRON ANNIHILATION IN LLQUID GASES

A. T. STEWART, D. ROCKMORE, P. VARLASHKIN

SD-100
/65- /

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GGQ 595161 1 FIELD 5A,20M,20L

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, PHYSICS, NORTH CAROLINA

POSITRONIUM IN INSULATORS

A. T. STEWART, D. ROCKMORE, P. VARLASHKIN

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/65-

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GDQ 595163 1 FIELD 20M, 5A,20L

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, PHYSICS, NORTH CAROLINA

TUNNELING IN SINGLE CRYSTAL SUPERCONDUCTORS

E. N. MITCHELL

SD-100
/65-

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GDQ 595242 1 FIELD 5A,20L

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, MARYLAND

CRITICAL CURRENTS IN SUPERCONDUCTORS

E. A. STERN, A. K. BHATNAGAR

SD-101
/65-

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GDQ 595248 FIELD 20M, 9+, 5A,20L

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, MARYLAND

HYPERSONIC PHONON-ELECTRON INTERACTIONS AT 1 GC-SEC

J. R. LEIBOWITZ, E. A. PAGE

SD-101
/65-

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GDQ 595249 FIELD 5A,20L

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, MARYLAND

MAGNETOACOUSTIC INVESTIGATIONS IN METALS

A. C. SINCLAIR, J. R. LEIBOWITZ

SD-101
/65-

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GDQ 595250 FIELD 20M, 5A,20L, 7B

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, MARYLAND

PHONON-ELECTRON INTERACTIONS IN SUPERCONDUCTORS

J. R. LEIBOWITZ, J. G. STCLAIR

SD-101
/65-

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GDQ 595264 FIELD 20M, 5A,20L, 7B

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, MARYLAND

THERMAL CONDUCTIVITY OF SUPERCONDUCTORS

S. M. BHAGAT, A. T. SFALEMITSOS

SD-101
/65-

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GDQ 595265 FIELD 20M,20L, 7B

MAGENTORESISTANCE IN RARE EARTHS

J. R. ANDERSON

SD-101
/65-

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GSE 311 2 FIELD 7D,11G,12A

BROWN UNIVERSITY, GRADUATE SCHOOL APPLIED MATHEMATICS, RHODE ISLAND

PROBLEMS IN THE THEORY OF FINITE ELASTIC DEFORMATIONS

R. T. SHIELD

NSF-GP-991
4/65-10/65

NSF-ENGINEERING SCIENCES DIVISION

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GSE 654 FIELD 11B,11F,11G,20L

UNIVERSITY OF COLORADO, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, COLORADO

RESPONSE OF CONCRETE STRUCTURES TO CYCLIC LOADING

K. H. GERSTLE, L. G. TULIN

NSF-GK-338
9/65- 8/66

NSF-ENGINEERING SCIENCES DIVISION

****

GSE 682 FIELD 11G,20F,20L

ILLINOIS INST OF TECH, SCHOOL OF ENGINEERING, MECHANICS, ILLINOIS

DYNAMIC PHOTOELASTICITY

J. W. DALLY

NSF-GK-364
8/65- 7/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 699 FIELD 11G,12A,13M,20L

GEORGE WASHINGTON UNIV, SCHOOL OF ENGINEERING, ENGINEERING, DIST OF COLUMBIA

STRAIN HARDENING OF THIN PLATES SUBJECTED TO DYNAMIC LOADS

T. G. TORIDIS

NSF-GK-357
9/65- 8/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 706 FIELD 11G,11D,20L,20K

UNIVERSITY OF FLORIDA, SCHOOL OF ENGINEERING, ENGIN SCIENCE + MECH, FLORIDA

PLASTIC ANALYSIS OF SANDWICH STRUCTURES

I. K. EBCIOGLU

NSF-GK-440
9/65- 8/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 719 FIELD 8K,11G,20L,20K

MICHIGAN STATE UNIV, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, MICHIGAN

DYNAMIC RESPONSE OF ELATO-INELASTIC STRUCTURES

R. K. WEN

NSF-GK-590
9/65- 8/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 727 FIELD 3A,11B,11G,20L

UNIV OF ROCHESTER, SCHOOL OF ENGINEERING, AEROSPACE + MECH SCI, NEW YORK

RESPONSE OF SOLIDS TO LASER PULSE IRRADIATION

G. H. CONNORS

NSF-GK-436
9/65- 8/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 757 FIELD 11F,13M,11G, 9A

PENNSYLVANIA ST UNIV, GRADUATE SCHOOL, PHYSICS, PENNSYLVANIA

ATOMIC STRUCTURE OF MECHANICAL AND ELECTRICAL CONTACT POINTS

E. W. MUELLER

NSF-GK-467
11/65-10/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 769 FIELD 11G,20L,20D

LEHIGH UNIVERSITY, SCHOOL OF ENGINEERING, METALLURGICAL ENGIN, PENNSYLVANIA

PLASTIC FLOW THROUGH CONVERGING SURFACES

B. AVITZUR

NSF-GK-231
5/65- 5/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 770 FIELD 20L,20K

YALE UNIVERSITY, SCHOOL OF ENGINEERING, ENGINEERING + APPL SCI, CONNECTICUT

VIBRATIONS OF SHELLS

A. KALNINS

NSF-GK-195
6/65- 9/65

NSF-ENGINEERING SCIENCES DIVISION

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GSE 772 FIELD 20D

PURDUE UNIVERSITY, SCHOOL OF ENGINEERING, AERONAUT + ENGIN SCI, INDIANA

THEORETICAL AND EXPERIMENTAL STUDIES ON NONLINEAR RHEOLOGY

G. LIANIS

NSF-GK-413
5/65- 5/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 773 FIELD 20L

BROWN UNIVERSITY, GRADUATE SCHOOL, ENGINEERING, RHODE ISLAND

PLASTIC AND VISCOUS DEFORMATION

E. T. ONAT

NSF-GK-473
6/65- 9/65

NSF-ENGINEERING SCIENCES DIVISION

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GSE 781 FIELD 7C, 7D

UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, NUCLEAR ENGINEERING, MICHIGAN

NEUTRON INELASTIC SCATTERING FROM HIGH POLYMERS

G. C. SUMMERFIELD

NSF-GK-476
6/65- 6/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 785 FIELD 20D

PURDUE UNIVERSITY, SCHOOL OF ENGINEERING, AERONAUT + ENGIN SCI, INDIANA

THEORETICAL AND EXPERIMENTAL STUDIES IN FLUID MECHANICS

P. S. LYKOUDIS

NSF-GK-181
3/65- 3/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 787 FIELD 20M, 5A

AMER. SOC. OF MECH., NEW YORK

THIRD SYMPOSIUM ON THERMOPHYSICAL PROPERTIES

S. GRATCH

NSF-GK-166
2/65- 2/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 789 1 FIELD 20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

YIELD CRITERION FOR REINFORCED CONCRETE SLABS

M. A. SOZEN, W. L. GAMBLE

NSF-GK-171
3/66- 3/67

NSF-ENGINEERING SCIENCES DIVISION

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GSE 818 FIELD 20D

UNIV OF CAL-DAVIS, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, CALIFORNIA

FLOW IN POROUS MEDIA

S. WHITAKER

NSF-GK-477
6/65- 6/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 820 FIELD 20L

UNIVERSITY OF DELAWARE, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, DELAWARE

INVESTIGATION OF ENGINEERING ELASTOMECHANICS

J. L. NOWINSKI

NSF-GK-430
5/65- 5/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 823 FIELD 20D

TIME DEPENDENT FLOW AND BOUNDARY LAYER PHENOMENA

S. C. ROBERTS

NSF-GK-369
5/65- 5/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 825 FIELD 20L,20D,20K

NORTHWESTERN UNIV, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

FORCES ON A SPHERE ACCELERATING IN A VISCOUS FLUID

M. S. HAMILTON, L. F. HOCKROS

NSF-GK-479
6/65- 6/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 827 FIELD 20D,20K

PURDUE UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, INDIANA

FLUIDELASTIC OPERATORS FOR UNDER-STREAMLINED STRUCTURES

G. H. TOEBES

NSF-GK-414
5/65- 5/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 834 FIELD 11G,20D

COUPLING OF FLOWS THROUGH POROUS MATERIALS

D. D. JOSEPH

NSF-GK-367
5/65- 5/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 838 FIELD 9+,20F

WORCESTER POLY INST, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, MASSACHUSETTS

WAVE PROPAGATION

G. H. OWYANG

NSF-GK-199
~~4/65- 4/66~~

NSF-ENGINEERING SCIENCES DIVISION

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GSE 840 FIELD 20D

UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, MICHIGAN

STABILITY OF THE OSCILLATING FREE-CONVECTIVE BOUNDARY LAYER

J. A. CLARK, V. S. ARPACI

NSF-GK-214
4/65- 4/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 850 FIELD 20D

BOUNDARY LAYER FLOW OF A RADIATING GAS

R. D. CESS

NSF-GK-345
4/65- 4/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 854 FIELD 20D

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, MASSACHUSETTS

INFLUENCE OF CORIOLIS FORCES ON TURBULENT FLOW IN DUCTS

P. G. HILL, W. L. MOSES

NSF-GK-470
6/65- 6/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 860 FIELD 20L

CAL INST OF TECHNOLOGY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CALIFORNIA

INJECTION AND RECOMBINATION MECHANISMS IN SEMICONDUCTORS

A. YARIV

NSF-GK-901
6/65-12/65

NSF-ENGINEERING SCIENCES DIVISION

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GSE 861 FIELD 20L

ELECTRON ENERGY BANDS IN METALS

C. T. WEI

NSF-GK-475
6/65- 6/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 862 FIELD 7D,20J,20D

CRYSTAL NUCLEATION USING ULTRA HIGH VACUUM MOLECULAR BEAM TECHNIQUES

J. B. HUDSON

NSF-GK-456
6/65- 6/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 863 FIELD 20L

UNIV OF CAL-BERKELEY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CALIFORNIA

PROPAGATION OF ELASTIC WAVES IN SEMICONDUCTORS

R. M. WHITE

NSF-GK-431
6/65- 6/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 864 FIELD 11G,20L

CARNEGIE INST TECHNOL, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, PENNSYLVANIA

NEW STRUCTURES IN ALLOYS AND SEMICONDUCTOR MATERIALS

R. L. LONGINI, G. M. POUND

NSF-GK-454
6/65- 6/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 866 FIELD 20L

RICE UNIVERSITY, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, TEXAS

RADIATION DAMAGE IN SEMICONDUCTORS

M. L. RUDEE

NSF-GK-453
6/65- 6/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 867 FIELD 20L, 7B

STEVENS INST OF TECH, SCHOOL OF ENGINEERING, METALLURGY, NEW JERSEY

ELECTROMECHANICAL EFFECTS IN ALKALI HALIDE SINGLE CRYSTALS

M. OHRING

NSF-GK-439
6/65- 6/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 870 FIELD 20I

CASE INST OF TECHNOL, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, OHIO

SHOCK TUBE INVESTIGATIONS OF HIGH TEMPERATURE GAS

E. J. MORGAN, W. B. JOHNSON, S. OSTRACH

NSF-GK-462
5/65- 5/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 874 FIELD 20J,20L

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CALIFORNIA

SPECTROSCOPIC STUDIES OF MAGNETIC MATERIALS

R. L. WHITE

NSF-GK-202
5/65- 5/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 880 FIELD 20I

THERMAL RADIATION ON ONE-DIMENSIONAL SHOCK WAVE PROPAGATION

R. WATSON

NSF-GK-219
4/65- 4/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 881

CITY UNIV N Y NEW YORK, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, NEW YORK

CENTRIFUGAL ELECTROSTATICALLY FOCUSED ELECTRON BEAMS

M. ETTENBERG

NSF-GK-197
4/65- 4/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 882 FIELD 20I

UNIVERSITY OF ARIZONA, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, ARIZONA

WAVE PROPAGATION IN A PLASMA WAVEGUIDE

R. N. CARLILE

NSF-GK-203
4/65- 4/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 886 FIELD 20H,20L

HIGH-TEMPERATURE DIELECTRIC-CONSTANT MEASUREMENTS

R. A. NEUBAUER

NSF-GK-348
5/65- 5/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 894 FIELD 9+,12A,20F

OHIO STATE UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, OHIO

TIME DOMAIN INTERPRETATIONS OF SCATTERING PHENOMENA

E. M. KENNAUGH

NSF-GK-708
11/65-11/66

NSF-ENGINEERING SCIENCES DIVISION

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GSE 907 FIELD 20D

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, AEROSPACE ENGINEERING, TEXAS

MASS TRANSFER COOLING

S. W. YUAN

NSF-GK-701
11/65-11/66

****

GSP 536 3 FIELD 20J,20C,20L, 7B

UNIV OF CAL-BERKELEY, SCHOOL OF CHEMISTRY, CHEMISTRY, CALIFORNIA

ELECTRONIC PROPERTIES OF SOLIDS

C. T. OKONSKI

NSF-GP-2329
9/64- 9/65

NSF-PHYSICAL SCIENCES DIVISION

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GSP 875 2 FIELD 18A

NORTHWESTERN UNIV, GRADUATE SCHOOL, PHYSICS, ILLINOIS

INVESTIGATION OF HYPERFRAGMENTS

J. H. ROBERTS, R. G. AHMAR

NSF-GP-8
7/64- 6/65

NSF-PHYSICAL SCIENCES DIVISION

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GSP 875 3 FIELD 18A

NORTHWESTERN UNIV, GRADUATE SCHOOL, PHYSICS, ILLINOIS

INVESTIGATION OF HYPERFRAGMENTS

J. H. ROBERTS, R. G. AHMAR

NSF-GP-8
7/65- 9/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 928 2 FIELD 20H,18A,20L

UNIV OF KENTUCKY, GRADUATE SCHOOL, PHYSICS, KENTUCKY

ELEMENTARY PARTICLE RESONANCE STUDIES

V. P. KENNEY, J. G. MOHAT, W. D. SHEPHARD C. N. VITTITOE

NSF-GP-880
7/64- 6/65

NSF-PHYSICAL SCIENCES DIVISION

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GSP 928 3 FIELD 20H,18A,20L

UNIV OF KENTUCKY, GRADUATE SCHOOL, PHYSICS, KENTUCKY

ELEMENTARY PARTICLE RESONANCE STUDIES

V. P. KENNEY, J. G. MOHAT, W. D. SHEPHARD C. N. VITTITOE

NSF-GP-880
7/65- 9/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 1515 1 FIELD 20J,20C, 5A,20L

UNIV OF PITTSBURGH, GRADUATE SCHOOL, PHYSICS, PENNSYLVANIA

NUCLEAR MAGNETIC RESONANCE

M. I. GOLDBURG

NSF-GP-2478
4/65- 4/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2073 1 FIELD 20D, 5A, 7B

UNIV OF PENNSYLVANIA, GRADUATE SCHOOL, PHYSICS, PENNSYLVANIA

LIQUID HELIUM

K. R. ATKINS

NSF-GP-3708
11/65-11/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2259 FIELD 20F,20L

UNIVERSITY OF MICHIGAN, GRADUATE SCHOOL, CHEMISTRY, MICHIGAN

ELECTRICAL-CONDUCTING ATTENUATED, TOTAL-REFLECTANCE CRYSTALS

H. B. MARK

NSF-GP-4620
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2389 1 FIELD 5A,20A

UNIV OF VT + ST AGRIC, GRADUATE SCHOOL, PHYSICS, VERMONT

MICROBUBBLE DYNAMICS IN ULTRASONIC WAVES

T. D. SACHS

NSF-GP-4131
2/66- 2/67

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2390 1 FIELD 5A,20L

NEW YORK UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NEW YORK

ELECTRONIC CONDUCTIVITY IN ORGANIC SOLIDS

M. POPE, H. P. KALLMAN

NSF-GP-4206
3/66- 3/67

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2392 FIELD 20J, 5A,20L

YALE UNIVERSITY, GRADUATE SCHOOL, PHYSICS, CONNECTICUT

FAR INFRARED SPECTROSCOPY OF SPIN WAVES

R. G. WHEELER

NSF-GP-4202
4/65- 4/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2394 FIELD 11F,11G, 5A

TULANE UNIV OF LA, GRADUATE SCHOOL, PHYSICS, LOUISIANA

DISLOCATIONS IN LAMELLAR CRYSTALS OF COLLOIDAL GOLD

R. M. MORRISS

NSF-GP-4230
4/65- 4/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2395 FIELD 9+, 9A, 9A,20F

COLUMBIA UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NEW YORK

INTERACTION OF MICROWAVES WITH ELECTRON TUNNELING IN SUPERCONDUCTORS

M. A. BOORSE

NSF-GP-4324
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2399 FIELD 9+,20F

UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, MICHIGAN

ACOUSTIC AND ELECTROMAGNETIC SCATTERING PROBLEMS FOR LOW FREQUENCIES

T. B. SENIOR, R. E. KLEINMAN, C. TAI

NSF-GP-4581
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2419 FIELD 12A,20M,20J

RENSSELAER POLYTC INST, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

MECHANICS OF CONTINUOUS BODIES

G. M. HANDELMAN, C. BLOOM, D. COHEN G. HABETLER, P. MCGLOIN, P. SLEPIAN

NSF-GP-4177
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2421 FIELD 5A,20L

CORNELL UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NEW YORK

INTERNATIONAL CONFERENCE ON THE PHYSICS OF X-RAY SPECTRA

L. G. PARRATT, J. A. BEARDEN E. L. JOSSEM

NSF-GP-4136
2/65- 2/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2422 FIELD 5A,20L

CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, ENGIN PHYS + MAT SCI, NEW YORK

CRITICAL PHENOMENA, DEFECTS AND IDEAL CRYSTALS

W. W. WEBB

NSF-GP-4295
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2424 FIELD 5A, 7D

GORDON RES CONF KING, RHODE ISLAND

GORDON RESEARCH CONFERENCE ON PHOTONUCLEAR REACTIONS

W. G. PARKS, G. R. BISHOP, W. +. PARKS M. D. WHITEHEAD

NSF-GP-4122
2/65- 2/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2427 FIELD 5A,20L

UNIVERSITY OF UTAH, GRADUATE SCHOOL, PHYSICS, UTAH

NMR STUDIES OF ULTRASLOW ATOMIC AND MOLECULAR MOTIONS

D. C. AILION

NSF-GP-4302
4/65- 4/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2429 FIELD 5A,20L

UNIVERSITY OF ILLINOIS, GRADUATE SCHOOL, PHYSICS, ILLINOIS

PROPERTIES OF SUPERCONDUCTORS

D. M. GINSBERG

NSF-GP-4265
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2430 FIELD 20J, 5A

PRINCETON UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NEW JERSEY

HIGH RESOLUTION MASS SPECTROSCOPY

W. BLEAKNEY, L. SMITH

NSF-GP-4269
4/65- 4/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2431 FIELD 5A,20L

UNIV OF PENNSYLVANIA, GRADUATE SCHOOL, PHYSICS, PENNSYLVANIA

NUCLEAR RESONANCE IN SOLIDS

A. J. HEEGER

NSF-GP-4178
3/65- 3/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2432 FIELD 20D, 5A

UNIVERSITY OF OKLAHOMA, GRADUATE SCHOOL, PHYSICS, OKLAHOMA

STATIONARITY IN VISCOUS FLOW, SIMULTANEOUS ROTATION AND TRANSLATION

S. BROERSMA

NSF-GP-4329
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2433 FIELD 20J, 5A

UNIVERSITY OF OKLAHOMA, GRADUATE SCHOOL PHYSICS, OKLAHOMA

PRESSURE BROADENED LINE WIDTHS IN MICROWAVE SPECTROSCOPY

C. C. LIN

NSF-GP-4246
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2435 FIELD 5A,20L

PURDUE UNIVERSITY, GRADUATE SCHOOL, PHYSICS, INDIANA

MOLECULAR LIBRATIONS IN CRYSTALS

M. M. JAMES

NSF-GP-4261
3/65- 3/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2437 FIELD 5A,20L,20J

CARNEGIE INST TECHNOL, SCHOOL OF ENGINEERING, PHYSICS, PENNSYLVANIA

STATISTICAL MECHANICS AND SOLID-STATE THEORY

J. S. LANGER, R. B. GRIFFITHS C. MAJUMDAR, B. J. MOLL

NSF-GP-4334
3/65- 3/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2438 FIELD 5A,20L

TUFTS UNIVERSITY, GRADUATE SCHOOL, PHYSICS, MASSACHUSETTS

IMPERFECTIONS IN CRYSTALLINE SOLIDS

K. A. MCCARTHY, L. GUNTHER, R. W. WEBB

NSF-GP-4322
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2440 FIELD 5A,18A,20M

LOUISIANA ST UNIV A+M, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, LOUISIANA

ULTRA-HIGH ENERGY ELEMENTARY PARTICLE PHENOMENA

R. W. HUGGETT, I. DAISUKE, N, M. NINOLIC K. PINKAU

NSF-GP-4198
3/65- 3/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2441 FIELD 5A,20L

STATE UNIV N Y BUFFALO, GRADUATE SCHOOL, PHYSICS, NEW YORK

MAGNETIC PROPERTIES OF SUPERCONDUCTORS

R. I. GAYLEY

NSF-GP-4332
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2442 FIELD 20M, 5A,20J

STANFORD UNIVERSITY, GRADUATE SCHOOL, PHYSICS, CALIFORNIA

MACROSCOPIC QUANTUM EFFECTS

W. M. FAIRBANK, M. EDWARDS

NSF-GP-4161
2/65- 2/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2443 FIELD 20M, 5A,20L

RICE UNIVERSITY, GRADUATE SCHOOL, PHYSICS, TEXAS

LOW TEMPERATURE AND SOLID STATE PHYSICS

H. E. RORSCHACH

NSF-GP-4282
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2445 FIELD 5A,20L

UNIVERSITY OF OREGON, GRADUATE SCHOOL, PHYSICS, OREGON

THEORY OF METALS

J. W. MCCLURE

NSF-GP-4506
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2446 FIELD 5A,20J

LEHIGH UNIVERSITY, GRADUATE SCHOOL, PHYSICS, PENNSYLVANIA

STATISTICAL MECHANICS AND TRANSPORT PROBLEMS

J. A. MCLENNAN, S. H. RADIN

NSF-GP-4497
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2449 FIELD 5A, 7D

GEORGIA INST OF TECH, GRADUATE SCHOOL, PHYSICS, GEORGIA

STUDIES OF NUCLEAR STRUCTURE

L. D. WYLY, C. H. BRADEN

NSF-GP-4614
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2458 FIELD 5A, 7D

UNIVERSITY OF FLORIDA, GRADUATE SCHOOL, PHYSICS, FLORIDA

POLARIZATION OF THE NEUTRONS IN STRIPPING REACTIONS

A. R. QUINTON

NSF-GP-4678
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2462 FIELD 20D, 5A,20F

UNIVERSITY OF ARKANSAS, GRADUATE SCHOOL, PHYSICS, ARKANSAS

X-RAY DIFFRACTION STUDIES OF LIQUIDS

G. T. CLAYTON

NSF-GP-4331
4/65- 4/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2463 FIELD 5A

ULTRASONIC WAVES IN ANISTROPIC MEDIA

R. A. ARTMAN

NSF-GP-4319
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2464 FIELD 5A,20H

ELEMENTARY PARTICLE THEORY

G. E. SCHRANK, J. R. FULCO, W. C. RAMSAY

NSF-GP-4204
4/65- 4/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2466 FIELD 5A,20F,20L

MICHIGAN STATE UNIV, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, MICHIGAN

DIFFRACTION OF LIGHT BY ULTRASONIC WAVES IN TRANSPARENT SOLIDS

E. A. HIEDEMANN, B. D. COOK

NSF-GP-4218
3/65- 3/66

NSF-PHYSICAL SCIENCES DIVISION

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GSP 2468 FIELD 5A,18A,20H,20J

TEMPLE UNIVERSITY, GRADUATE SCHOOL, PHYSICS, PENNSYLVANIA

RELATIVISTIC THEORY OF INTERACTING PARTICLES

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